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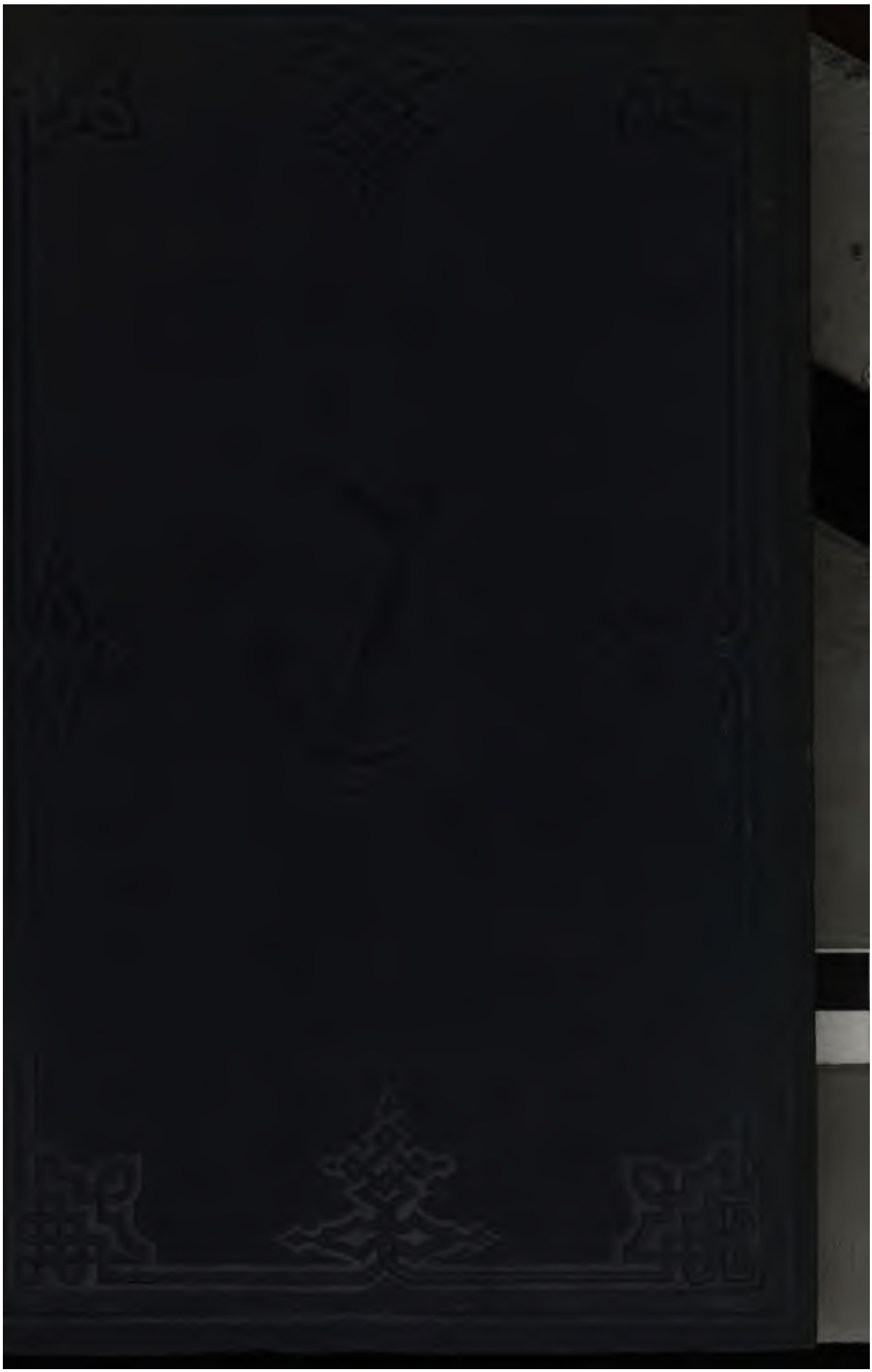
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PREFACE.

THE Proprietors of "Thompson's Tables," impressed with their utility in affording the simplest and readiest methods of Finding the Time, and clearing the Lunar Distance, now offer to Navigators a new edition, with such alterations and additions as will be found to render them further useful in practice at sea.

It may be essential to remark, with respect to the alterations, that none have been made affecting the principal objects of the work. They consist of a general adaptation of the references to the present arrangement of the Nautical Almanac. The substitution of the Sidereal Time Mean Noon for the Sun's Right Ascension, the former being less liable to error in reduction, and not requiring the Equation of Time to find the Mean Time by stellar and planetary observations; the introduction of a shorter and simpler method of calculating Altitudes; alterations in the arrangement of the letter press, by placing the second method of clearing the distance next to the first method, and the directions for finding the principal fixed Stars in the body of the work, instead of in an appendix.

The additions are, a Rule for making use of the facilities afforded by the Nautical Almanac for reducing the Sun's Declination, &c., which will be found a shorter method than having recourse to Logarithms.

A Rule to find the Sun's True Azimuth, at the same time with his horary angle, only two additional logarithms being required, which will be found convenient; for, by observing the Sun's Magnetic Azimuth at the moment of taking the altitudes for time, the variation of the compass is obtained, and the sights are rendered available for the purpose of finding the latitude by double altitudes. No prudent navigator will leave the determination of his latitude to the single chance of the Sun's meridian altitude.

An Example, to find the error and rate of a chronometer by lunars, and the bearings of land. Some remarks upon the sextant and chronometer, and an Example to find the time for longitude by chronometer, by the Moon's altitude, when the Sun is near to the meridian, which will be found useful in high latitudes, when the Sun has been clouded previously, and where the Sun's motion is too slow to obtain time by altitudes taken at a short interval on both sides of the meridian.

The Tables have been carefully revised, and the very few errors found in them have been corrected. The Tables of Secants and Sines have had their proper logarithmic titles affixed, to render them easier to be referred to in certain cases, and three tables, A, R, and P, have been added to facilitate finding the mean time by observation of the Stars and Planets.

The whole of the subordinate calculations have been introduced in a sufficient number of the Examples to afford references for learners. The experienced navigator knows when and where he can omit or curtail, and performs much of the subordinate work mentally.

It is earnestly recommended to the Masters and Mates of the Merchant Service to familiarize themselves with the lunar method of determining the longitude, instead of blindly trusting to the unchecked performance of a chronometer. This remark is not made to disparage that most excellent

piece of mechanism; but, to point out a positive duty, the neglect of which too frequently leads to disaster, particularly as circumstances frequently arise, such as a chronometer chain, or a spring, breaking, which throw the navigator upon his own resources. Then it is that the man who has been industrious, feels confident in the result of his observations; whilst, on the contrary, the idler blunders on in a fever of apprehension. Several instances have come to the writer's knowledge, where ships have been hove to at night, and an anxious look out kept for several days before the land was made, in consequence of this duty having been neglected.

It is also necessary to practice finding the latitude by the meridional altitudes of the Stars and Planets, and by the North-pole Star when out of the meridian, according to the method which is given in the Nautical Almanac (pp. 589 and 590). Ample directions are given in this work for finding the principal Fixed Stars, and the rule for working the Latitude by them. It frequently happens, when near the British Islands, as well as in other parts of the world, that the Sun is obscured at noon, though the night may afford many opportunities of determining the latitude; but, without practice, the navigator can place little confidence in his observations of the Stars. The Latitude by Stellar observations, serves as a check also, on that obtained by the Sun, and will help to detect a misapplication of the Sun's declination.

It is confidently hoped that the simplicity of the methods of calculation, and the excellent arrangement of the tables, will continue to this work the patronage it has so long enjoyed; though, perhaps, it is unnecessary to remark upon the merits of a work which has gone through so many editions, the statement of the fact being a sufficient guarantee for its value.

BOULTER J. BELL.

London, 1845.

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ABBREVIATIONS, &c.

Accel.	Acceleration.
Alt.	Altitude.
App.	Apparent.
Aug.	Augmentation.
Comp.....	Complement.
Eqn. T. ..	Equation of time.
Decg.	Decreasing.
Dist.	Distance.
Diff.....	Difference.
Decl.	Declination.
Gwh. D...	Greenwich date.
H. ∠	Hour angle.
Hor. Px...	Horizontal parallax.
Incg.	Increasing.
Lat.....	Latitude.
Long.	Longitude.
L. L.	Lower limb.
Merid.....	Meridian.
M. T. S. ..	Mean time ship.
M. T. G...	Mean time Greenwich.
N. A.	Nautical Almanac.
Obs.....	Observed.
P. D.	Polar distance.
R. A.	Right ascension.
Red.....	Reduced.
S. T. M. N.	Sidereal time mean noon.
T. alt.	True altitude.
U. L.	Upper limb.
+	Add.
—	Subtract.
×	Multiply.
÷	Divide.
=	Equal to.
~	Difference.
☉	Sunday, or the Sun.
☽	Monday, or the Moon.
♂	Tuesday, or Mars.
☿	Wednesday, or Mercury.
♃	Thursday, or Jupiter.
♀	Friday, or Venus.
♄	Saturday, or Saturn.
*	Star.

INTRODUCTION.

To prevent ambiguity in working the Examples, given to illustrate the use of the Tables, the reader is requested to attend to the following Remarks:—

1. By the *apparent time* at Greenwich is always meant *the apparent* astronomical time at that meridian, and by mean time at Greenwich the mean astronomical time is to be understood.

2. When the estimated civil or nautical time is given at any meridian, it is first reduced to the estimated astronomical time at the given place, to which the longitude of that place in time being applied by *addition* or *subtraction*, according as the longitude is *west* or *east*, the estimated astronomical time at Greenwich is obtained; and to this time all the articles required from the Nautical Almanac are always reduced, because, they are calculated for that meridian.†

The term "Greenwich Date," instead of *Greenwich time*, adopted by Inman and Raper in their works upon Nautical Astronomy, is more definite than the old term, and is therefore made use of in the following pages, to express that moment of time at Greenwich, simultaneous with any given date, at any other meridian, including the year, month, day, &c.

3. As the *civil time* is 12 hours in advance of the *astronomical time*, that is, the astronomical day commences at the noon of the civil

† The above remark shews, that it is of the utmost consequence, when without a Chronometer on board, that the time at Ship should be strictly attended to, as it is an element in every calculation, (except the correction of the Sun's declination for apparent noon, and the sidereal time at mean noon.)

When there is a Chronometer on board (having its error and rate), the Greenwich date will, in all requisite cases, be found most conveniently, by noting the time shewn by Chronometer at the moment of any observation, such as, in the method of finding the latitude by the Polar Star, out of the meridian, given in the Nautical Almanac, (p. 589,) &c.

day, of the same date, it is plain that when the given civil time is in the afternoon, or P.M., it answers to the astronomical time of the same date; but when the given civil time is before noon (or A.M.), we must add 12 hours to it, the sum will be the *astronomical time* for the day of the month preceding the given civil day. For example, 5h. 30m. P.M. civil time, on the 10th of May, is 5h. 30m. astronomical time of the same date. But 5h. 30m. A.M. civil time, on the 10th of May, is 17h. 30m. *astronomical time,* on the 9th of May; for the 9th day of the month, according to astronomical time, commences at the noon of the 9th civil day, and ends at the noon of the 10th civil day (the hours being reckoned up to 24), and 5h. 30m. A. M. of the 10th, is 17h. 30m. from noon on the 9th.

4. The *astronomical day* begins at the instant that the †*nautical day* (of the same date) ends, consequently nautical time is *always* 24 hours in advance of astronomical time; therefore, to turn nautical time into astronomical time, we have only to reckon the hours from the preceding noon, and then change the date to the preceding day. Thus, 5h. 30m. P.M. nautical time, on May the 10th, is 5h. 30m. astronomical time, on May the 9th; and 5h. 30m. A.M. nautical time, on May the 10th, is 17h. 30m. astronomical time on May the 9th, and so on.

5. The *noon* of the astronomical day is at the instant that it begins, and the noon of the nautical day is at the instant when it ends; and as both these take place at the noon of a civil day, of the same date, it is plain that the same noon answers for any given day in either of the three methods of reckoning time.

6. The *observed altitude,* or the *observed distance,* is the angle given by the instrument used in taking the observation, allowing for the index error, if any. Thus, if the distance measured by a sextant, which has an index error of 2′ 40″ additive, be 84° 21′ 50″, the observed distance will be 84° 21′ 50″ + 2′ 40″, or 84° 24′ 30″. But if the index error of the sextant were 2′ 40″ subtractive, and the same angle measured by it, then the observed distance would be 84° 21′ 50″ — 2′ 40″, or 84° 19′ 10″.

7. The *apparent altitude* of an object is found by applying its semidiameter, and the dip of the horizon,‡ to its observed altitude. The dip is always subtractive. The semidiameter is to be added or subtracted, according as the lower or upper limb of the object has been observed.

8. The *semidiameter* of the Sun is found in page II. of the month in the Nautical Almanac, that of the Moon, in page III.

† Nautical time has been generally abolished as inconvenient, the only advantage it possessed, was finishing the "day's work," and date together.

‡ The dip or depression of the horizon is contained in Table II.

for every 12 hours; namely, for noon and midnight, at Greenwich, when the Moon's semidiameter is required for any intermediate time, a proportional part of the difference or variation in 12 hours is to be applied to the semidiameter for noon or midnight: this gives the horizontal semidiameter, which is to be farther corrected by the augmentation from Table IV. (*see* the explanation of that Table.) The fixed stars having no sensible magnitudes, as seen from the Earth, are esteemed as mere lucid points; hence, no allowance is to be made for semidiameter in observations of the Fixed Stars.

9. The *apparent distance* between any two objects means the apparent distance of their centres, and is found by applying the semidiameters of those objects to the observed distance, by addition, or subtraction, according as the nearest or farthest limbs have been observed.

10. The *true altitude* of the Sun, or a Star, is found by subtracting the correction in altitude† from the *apparent altitude*. The true altitude of the Moon is found by adding the correction from Table XXI. to her apparent altitude, the true altitude of a Planet by deducting the parallax in altitude (Table P.), from the refraction (Table VI.), previously to subtracting the refraction from the apparent altitude of the Planet. In correcting a lunar distance, by the *first* method given in this work, the *apparent altitudes* only are used. In finding the time, the *true altitude* of the object is always used.

11. The *Moon's horizontal parallax* which is required to find her true altitude, and to clear the lunar distance, is found on page III. for the Month in the Nautical Almanac, and should be taken out at the same time with her semidiameter, and corrected in the same manner. The Planets' horizontal parallaxes and semidiameters are found on the right-hand pages of the month for each Planet in the Nautical Almanac.

12. The *polar distance* of an object is its distance from the elevated Pole of the observer. Hence, when the latitude of the place of observation, and the declination of the observed object, are both of the same name (that is, both North or both South), the difference between 90° and the declination is the *polar distance;* but when the latitude of the place, and the declination of the object, are of contrary names, the sum of 90° and the declination of the object is its *polar distance.*

13. The *Sun's declination* is found in pages I. and II. for the month in the Nautical Almanac for apparent and mean noons. The Moon's declination is given for every hour, in pages V. to XII. for the month. The Planet's declinations for mean noon every day are found under their respective names in the same work, also, the declinations of 100 Fixed Stars for the 1st January of each year, in

† Table VI. contains the correction of the apparent altitude of the Sun or a Star.

pages 432 to 434, with their annual variations. The following method of reducing (*see* Art. 2,) the Sun's declination will be found short and simple. Take out the declination for the noon nearest to the Greenwich date, from page I. or II. for the month, according as the Greenwich date is in apparent or mean time. If the Greenwich date be before the nearest noon, take the difference for one hour annexed to the preceding noon, to reduce the declination to the given intermediate interval. If the Greenwich date be after the nearest noon, take the difference for one hour annexed to the declination taken out to effect the reduction. The difference for one hour multiplied by the hours and parts† of an hour from the nearest noon, will be the quantity requisite to reduce the declination to the given interval from noon, to be added to or subtracted from the declination taken out, according as the declination is increasing or decreasing, or as the Greenwich date precedes or follows the nearest noon. The differences for one hour on page I. Nautical Almanac are to be used for their respective articles on page II.

EXAMPLE.

In Long. 15° W. required the ⊙'s decl. date M. T., (Astronomical.)

	d.	h.	m.				
1844, December . .	3	3	10	Diff. for 1 hour 3d Gwh. D. being after noon			20″ 25
Long. in time W. .	+	1	0				h. m.
				Interval from noon			× 4 10
Gwh. D. in M. T. .	3	4	10				
				10m. = $\frac{1}{6}$ of 1 hour diff. 20″25			81 00
				divide by 6			= 3 37
				Amount of reduction			1 24 37
Decl. S.° incg. p. II. N. A. for noon 3d					22°	10′	43″6
Add the reduction decl. incg. and Gwh. D. after noon . . .					+1	24	4
Decl. required					22	12	8 0

In Long. 15° W. required the ⊙'s decl. date in M. T. (Astronomical.)

	d.	h.	m.				
1844, December . . .	2	18	50	Diff. for 1 hour 2d Gwh. D. before noon,			21″ 33
Long. in time W. . . .	+	1	00	Interval from noon			× 4 10
Subt. from 24h. Gwh. D.	2	19	50	10m. $\frac{1}{6}$ diff. 21″ 33			85 32
				divide by 6			= 3 55
Interval before noon, 3d. being the nearest noon		4	10	Amount of reduction . . .			1 28 87
Decl. S° incg. p. II. N. A. for Noon 3d. being nearest noon .					22°	10′	43″ 6
Subt. the reduction decl. incg. and Gwh D. before Noon 3d. . .					—	1	28 9
Decl. required					22°	9	14 7

14. The *equation of time*, which is required to convert apparent time into mean time, and the contrary, is found on pages I. or II.

† 3m. = $\frac{1}{20}$ of an hour.
4m. = $\frac{1}{15}$,,
5m. = $\frac{1}{12}$,,
6m. = $\frac{1}{10}$,,

10m. = $\frac{1}{6}$ of an hour.
12m. = $\frac{1}{5}$,,
15m. = $\frac{1}{4}$,,
20m. = $\frac{1}{3}$,,

for the month, in the Nautical Almanac, and should be taken out with the Sun's declination and semidiameter. The same method of reduction to other dates and meridians is applicable to both equation of time and declination, as the differences for one hour of equation of time are given.

15. The *sidereal time at mean noon*, which is required to find the mean time, from observations of the Moon, Planets, or Fixed Stars, is found on page II. of the month in the Nautical Almanac. It is to be taken out for the given astronomical day at the place of observation, and to be reduced to that meridian by applying the acceleration for longitude, as directed in Table A, which contains the acceleration.

16. The *right ascensions* of the Moon, Planets, and Stars, also requisite for finding the mean or apparent time, by either of these bodies, are found at the same places in the Nautical Almanac, with their respective declinations, and should be taken out at the same time. The right ascension of the Moon being given for every hour, the proportional part for any intermediate portion of time is easily obtained, by finding the difference between the right ascension for the hour given, and the right ascension following, and taking one-third, or one-fourth, or one-sixth, &c., of the difference as may be required. Ample explanations are given at pages 582-3-4 in the Nautical Almanac for reducing the right ascensions and declinations of the Planets and Fixed Stars, to which refer.

17. When the Sun's right ascension is required, it is to be taken from pages I. or II. in the Nautical Almanac, according as the Greenwich date is in apparent or mean time; and as the differences for one hour are given, it can be reduced in the same manner as the declination.

18. The *fraction of the year* which is requisite for taking a proportional part for any date during the year, of the annual variations of the right ascensions and declinations of the Fixed Stars, given in the Nautical Almanac, is found on page XXII. for the month therein.

It is strongly recommended to young Navigators to make themselves well acquainted with all the explanations given in the Nautical Almanac, as well as the explanations of the Tables given in this work.

PROBLEM I.

Given the Latitude of a Place, together with the Sun's True Altitude and Declination; to find the Apparent Time of Observation; the Sun's True Azimuth, and the Mean Time.

RULE.

To find the Apparent Time.

1. Add together the Sun's altitude, the polar distance, and the latitude of the place of observation; find the half sum, and the difference between the half sum and the Sun's altitude.

2. To the logarithm of the polar distance, add the logarithm of the latitude and the logarithms of the half sum and difference, the sum of these 4 logarithms will be the logarithm of the apparent time.†

To find the Azimuth.

3. Take the difference between the half sum (already found), and the polar distance, call it Az.

4. Add together the secant of the altitude, the logarithms of the latitude and half sum (already found), and the cosine of Az. The sum of these 4 logarithms will be the logarithm of the Sun's true azimuth in time to be taken from the top of Table XIII., which convert into arc, by Table I.

5. This is to be reckoned from the South in North latitude, from the North in South latitude. Towards the East in the morning; the West in the afternoon.

EXAMPLE I.

Suppose the Sun's true altitude, west of the meridian, is 34° 0′, his declination 10° 0′ N. and the latitude of the place of observation 42° 0′ N. required the apparent time of observation and the Sun's true azimuth?

† Table XI. contains the logarithms of the latitude and polar distance, being a table of secants and co-secants; Table XII. the logarithms of the half sum and difference, being a table of cosines and sines; and Table XIII. the logarithms of the apparent time, or horary angle.

Sun's true altitude - -	34° 0′		Sec. 0·08143
Sun's polar distance - -	80 0	Log. 0·00665	
Latitude - - - - - -	42 0	Log. 0·12893	0·12893
Sum - - - - - - - -	156 0		
Half sum - - - - -	78 0	Log. 4·31788	4·31788
Difference - - - - -	44 0	Log. 4·84177	
Az. - - - - - - - -	2 0	———	Cos. 4·99974
Apparent time, P.M. 3h. 31m. 0s.		Log. 9·29523	———
⊙ True azimuth S. 71° W. = 4h. 44m. 0s. =			9·52798

EXAMPLE II.

In latitude 33° 56′ S. the Sun's true altitude, observed East of the meridian, was 24° 58′, and his declination at the same time was 2° 44′ N.; required the apparent time of observation and the Sun's true azimuth?

Sun's true altitude - -	24° 58′		Sec. 0·04261
Sun's polar distance -	92 44	Log. 0·00049	
Latitude - - - - -	33 56	Log. 0·08109	0·08109
Sum - - - - - - -	151 38		
Half sum - - - - -	75 49	Log. 4·38921	4·38921
Difference - - - - -	50 51	Log. 4·88958	
Az. - - - - - - - -	16 55	———	Cos. 4·98079
Apparent time - -	20h 11m. 8s.	Log. 9·36037	———
⊙ True azimuth N. 67° 52′ E. = 4h. 31m. 29s. =			9·49370

If civil, or nautical time be required, when the Sun is observed east of the meridian, reject 12 hours from the astronomical time. Thus, the civil or nautical time in the last Example, would be 8h. 11m. 8s. A. M., observing that when the date of the astronomical day is given, the date of the civil or nautical day will be one day farther advanced. In the practice of the lunar observations, the mean astronomical time at the place of observation is always to be found.

To find the Mean Time.

Having obtained the apparent time, apply to it the reduced equation of time, as directed in page I. for the month in the Nautical Almanac. The result will be the mean time required. (*See* Art. 2 and 14.)

PROBLEM II.

Given the True Altitude of a Fixed Star, together with its Right Ascension and Declination, the Latitude of the Place of Observation, and the Sidereal Time at Mean Noon, to find the Mean Time when the Altitude is observed.

RULE.

1. With the latitude of the place, the Star's true altitude and declination, find the Star's horary distance *west* of the meridian, in the same manner as the Sun's horary angle is found by Problem I.

2. To the complement, to 24 hours, of the sidereal time at mean noon, add the right ascension of the Star, and its horary distance *west* of the meridian; the sum, rejecting 24 or 48 hours if necessary, will be the time from noon, in sidereal hours, minutes, &c., from which subtract the retardation (Table R.), the result will be the mean time required.

EXAMPLE I.

In latitude 33° 51′ N. the true altitude of *Regulus*, observed west of the meridian, was 39° 21′; the Star's declination was 12° 50′ N.; its right ascension 9h. 58m. 51s.; and the sidereal time at mean noon 3h. 22m. 8s.: required the mean time of observation?

	h.	m.	s.				
				*'s True alt.	39°	21′	
				*'s Polar dist.	77	10	Log. 0·01099
	24	0	0	Latitude	33	51	Log. 0·08066
Sid. time at M. N. - -	3	22	8	Sum -	150	22	
				Half sum	75	11	Log. 4·40778
Comp. of sid. T. at M. N	20	37	52	Difference	35	50	Log. 4·76747
*'s R. A. - - - - -	+ 9	58	51				
*'s Dist. W. of merid.	+ 3	23	44	- - - - - - - -			Log. 9·26690
Sum.—24h.=Sid. h. &c.	10	0	27				
Retardation - - - -	—	1	38†	10h. R. = 1m. 38s. 30 27s. R. = 07			
Mean time required - -	9	58	49				

EXAMPLE II.

In latitude 23° 31′ S. the true altitude of *Rigel*, observed East of the meridian, was 28° 42′; the declination of the Star being 8° 25′ S., and its right ascension 5h. 5m. 55s.; the sidereal time at mean noon 12h. 49m. 31s.: required the mean time when the altitude was observed?

† The decimal parts are rejected, being less than half a second.

	h.	m.	s.
	24	0	0
Sid. time at M. N. -	—12	49	31
Comp. of sid. T. at M. N.	11	10	29
*'s R. A. - - - - -	+ 5	5	55
*'s Dist. W. of merid.	+19	50	51
Sum—24h.=Sid. h. &c.	12	7	15
Retardation - - -	—	1	59
Mean time required - -	12	5	16

*'s True alt.	28°	42′	
*'s Polar dist.	81	35	Log. 0·00470
Latitude	23	31	Log. 0·03766
Sum -	133	48	
Half sum	66	54	Log. 4·59366
Difference	38	12	Log. 4·79128
- - - - - - - - -			Log. 0·42730

12h. R. = 1m. 57s. 96
7m. " = 1 15
15s. " = 04

Should apparent time be required, apply the equation of time, as directed on p. II., Nautical Almanac, to the mean time obtained.

REMARKS.

I. The method here given of deducing the mean time from the meridian distance of a Star is somewhat different from that usually given, but the result is the same in both methods. The following is the *Rule* generally given.

When the Star is observed *East* of the meridian, *subtract* its horary distance from the meridian from its right ascension, increased by 24 hours, if necessary; the remainder will be the right ascension of the meridian. When the observation is made *West* of the meridian, *add* the right ascension of the Star to its meridian distance, the sum will be the right ascension of the meridian.

From the right ascension of the meridian, increased by 24 hours, if necessary, subtract the Sun's right ascension; the remainder will be the apparent time of observation. Apply the equation of time to the apparent time, as directed in the Nautical Almanac, p. I., the result will be the mean time required.

II. When a Star is observed *West* of the meridian, it is plain that its horary angle, reckoned west of the meridian, is *less* than 12 hours: But if a Star be observed *East* of the meridian, its horary angle, reckoning westward of the meridian, must be *greater* than 12 hours, for in this case it is the complement to 24 hours of the Stars horary distance East of the meridian; therefore, when the Star is observed *West* of the meridian, the hours of the horary angle will be found at the top of Table (XIII.); but when the Star is observed *East* of meridian, the hours of the horary angle must be taken from the bottom of that Table, exactly in the same manner as the Sun's horary angle is found.

III. With the true altitude, the right ascension and declination of

the Moon or any other Planet, the time may be found, the same as by a Fixed Star.

PROBLEM III.

Given the Apparent Distance of the Moon from the Sun, a Planet, or a Star, together with the Apparent Altitudes of the Objects, and the Moon's Horizontal Parallax: to find the True Distance.

Method I.

RULE.

1. To the logarithm of the Moon's horizontal parallax, add the logarithm of the apparent altitude of the Sun, Planet, or Star, and the logarithm S. of the apparent distance, the Sum will be the logarithm of the *first correction.*

2. To the logarithm of the Moon's horizontal parallax, add the logarithm of the Moon's apparent altitude, and the logarithm T. of the apparent distance, the sum will be the logarithm of the *second correction.*†

3. Take the *third correction* from Table XVIII. corresponding to the given apparent distance and altitudes.

4. Add these three corrections to the apparent distance, the sum, rejecting 10 degrees, will be the true distance.

EXAMPLE I.

Let the apparent distance between the Moon and a Fixed Star be 72° 0′ 0″; the apparent altitude of the Star 32° 0′; that of the Moon 26° 0′, when the Moon's horizontal parallax is 59′ 0″: required the true distance?

Moon's hor. par.	0°	59′	0″	Log.	0·0244	- - - - - -		Log.	0·0244
Star's app. alt.	32	0	0	Log.	0·7358	☽'s App. alt.	26°0′	Log.	0·8182
App. distance -	72	0	0	Log. S.	0·9782	- - - - -		Log. T.	1·4882
First correct. +	4	27	7	Log.	1·7384				———
Second correct. +	5	8	24	- - - - - - - - - - -				Log.	2·3308
Third correct. +		1	33						
Sum—10° = True dis.	71	37	4						

† The logarithms of the Moon's hor. par. are contained in Table XIV.; those of the apparent altitudes in Table XV.; the logarithm S. and logarithm T. in Table XVI.; and the logarithms of the first and second corrections in Table XVII.

EXAMPLE II.

Suppose the apparent distance between the Sun and Moon to be 86° 19′ 10″, the Sun's apparent altitude 26° 3′, that of the Moon 66° 38′, and her horizontal parallax 55′ 47″: required the true distance?

Moon's hor. par	0° 55′ 47″	Log.	0·0488	- - - - -		Log.	0·0488
Sun's app. alt.	26 3 —	Log.	0·8174	☽'s Ap. alt.	66° 38′	Log.	0·4972
App. distance -	86 19 10	Log.S.	0·9991	- - - - -		Log.T.	2·1913
First correct. +	4 35 27	Log.	1·8653				
Second correct. +	5 3 18	- - - - - - - - - -				Log.	2·7373
Third correct. +	2 10						
Sum−10°=True dis.	86 0 5						

If the distance in this Example were between the Moon and a Star, the third correction would be 2′ 18″; but the distance being between the Sun and Moon, the effect of the Sun's parallax on the distance is to be applied; now this is found in Table P. to be 8″ subtractive, the third correction is therefore 2′ 10″.

EXAMPLE III.

Let the apparent distance between the Moon and a Star be 96° 36′ 31″; the apparent altitude of the Moon 32° 12′; the Star's apparent altitude 47° 32′; and the Moon's horizontal parallax 54′ 0″: required the true distance?

Moon's hor. par.	0° 54′ 0″	Log.	0·0629	- - - - -		Log.	0·0629
Star's app. alt.	47 32 0	Log.	0·5921	☽'s ap. alt.	32° 12′	Log.	0·7334
App. distance	96 36 31	Log.S.	0·9971	- - - - -		Log.T.	1·9355
First correct +	4 19 54	Log.	1·6521				
Second correct +	4 56 40	- - - - - - - - - -				Log.	2·7318
Third correct +	2 14						
Sum−10°=True dis.	95 55 19						

EXAMPLE IV.

The apparent distance between the Sun and Moon being 41° 16′ 25″; the Sun's apparent altitude 46° 27′; that of the Moon 21° 9′; and the Moon's horizontal parallax 60′ 35″: required the true distance?

Moon's hor. par.	0° 60′ 35″	Log.	0·0129				Log.	0·0129
Sun's app. alt.	46 27 —	Log.	0·5998	☽'s Ap. alt.	21° 9′	Log.	0·9027
App. distance	41 16 25	Log.S.	0·8193	- - - - - -		Log.T.	0·9432
First correct +	3 53 26	Log.	1·4320				
Second correct +	5 24 55	- - - - - - - - - -				Log.	1·8588
Third correct +	1 41						
Sum−10°=True dis	40 36 27						

The following collection of Examples will be useful as exercises in finding the true distance.

Exam	☽'s Hor. Par.		App. alt. of ☉ or ✳.			☽'s App. alt.		Apparent Dist.			True Distance.		
1	56′	21″	☉	20°	44′	23°	58′	59°	58′	54″	59°	50′	24″
2	58	45	✳	27	43	48	22	81	23	38	81	4	32
3	56	32	☉	25	16	19	19	72	21	40	72	8	50
4	61	10	✳	11	51	44	33	64	36	40	64	46	14
5	59	21	☉	72	22	31	8	75	28	43	74	40	3
6	59	21	☉	54	12	48	40	76	0	33	75	23	27
7	56	56	☉	81	34	14	53	101	33	29	101	2	49
8	55	22	✳	48	18	22	43	77	44	4	77	8	25
9	60	39	✳	42	54	26	3	55	2	48	54	32	26
10	54	20	✳	49	31	34	27	92	10	41	91	30	14
11	56	13	☉	66	50	21	30	57	16	19	56	30	15
12	58	35	☉	19	4	41	6	103	29	27	103	3	18
13	56	15	✳	24	48	12	30	51	28	35	51	9	51
14	57	20	✳	17	56	85	4	35	48	11	36	5	21
15	54	59	☉	33	24	50	59	64	4	47	63	53	13
16	55	53	✳	19	50	61	52	42	21	16	42	49	17

The mark ☉ signifies that the distance is between the Sun and Moon, and the mark ✳ that the distance is between the Moon and a Star.

We shall now proceed to show the application of Tables XX., XXI., XXII., XXIII., XXIV. and XXV., to the clearing of apparent lunar distances from the effects of parallax and refraction. This operation cannot be performed by these Tables in quite so short a time as it may be by Tables XIV., XV., XVI., XVII., and XVIII.; but it is perhaps the shortest and easiest method that has yet been proposed, on the same principle. It is also strictly correct, and applicable to all cases.

Method II.

RULE.

I. Find the difference of the apparent altitudes of the objects, and the corrections of their altitudes.

II. To the correction of the apparent altitude of the Sun, Planet, or Star, add the correction of the Moon's apparent altitude, the sum being added to the difference of the apparent altitudes when the Moon has the higher altitude, or subtracted from the difference of the apparent altitudes when the Sun, Planet, or Star has the higher altitude, will give the difference of the *true altitudes*.

III. Find the *difference* between the apparent distance and the difference of the apparent altitudes, and also the *sum* of the apparent distance and the difference of the apparent altitudes; omitting the seconds in the apparent distance.

IV. To the logarithm of the Moon's apparent altitude add the logarithms of the *difference* and *sum*, the sum of these three logarithms will be the log. of a natural number, to this number add the N.V.S of the difference of the true altitudes; this will give the N.V.S. of an arc, to which add the seconds omitted in the apparent distance, the sum will be the *true distance*.

EXAMPLES.

I. Let the apparent distance between the Moon and a Star be 60° 0′ 0″, the Star's apparent altitude 24° 0′, and that of the Moon 16° 0′ when the Moon's hor. par. is 58′ 0″. Required the true distance.

	°	′	″		°	′	″		
Star's app. alt.	24	0	0	App. dist.	60	0	0		
Moon's app. alt.	16	0	0	Diff. app. alts.	8	0		Log. ☽'s app. alt.	4·299193
Difference of app. alts.	8	0	0	Difference	52	0		Log.	0·641842
Corr. *'s alt. 2 8 / Corr. ☽'s alt. 52 28	—	54	36	Sum	68	0		Log.	0·747562
				N. Num.	488199			Log.	5·688597
Difference of true alts.	7	5	24	N. V. S.	007647				
Arc	59	43	29	N. V. S.	495846				
Seconds omitted	+		0						
True distance	59	43	29						

II. Suppose the apparent distance between the Sun and Moon is 70° 5′ 52″, the apparent altitude of the Sun 58° 3′, the Moon's apparent altitude 36° 40′ and hor. par. 54′ 50″. Required the true distance.

	°	′	″		°	′	″	
Sun's app. alt.	58	2	0	App. dist.	70	5	52	
Moon's app. alt.	36	40	0	Diff. app. alts.	21	22		Log. ☽'s app. alt. 4·297065
Diff. of app. alts.	21	22	0	Difference	48	43		Log. 0·615363
Corr. ⊙'s alt. 0 31 } Corr. ☽'s alt. 42 42 }	— 43		13	Sum	91	27		Log. 0·854911
				N. num.	585248			Log. 5·767339
Diff. of true alts.	20	38	47	N. V. S.	064224			
Arc	69	28	49	N. V. S.	649472			
Seconds omitted	+		52					
True distance	69	29	41					

If the Moon have the higher altitude, the corrections of the apparent altitudes may be added to the differences of the apparent altitudes for the purpose of finding the difference of the true altitudes, without first adding the corrections together, as is mentioned in Precept I. of the Rule. Thus, in the next Example.

III. Let the apparent distance between the Sun and Moon be 81° 23′ 38″, the Sun's apparent altitude 27° 43′, and that of the Moon 48° 22′ when the Moon's hor. par. is 58′ 45″. Required the true distance.

	°	′	″		°	′	″	
Sun's app. alt.	27	43	0	App. dist.	81	23	38	
Moon's app. alt.	48	22	0	Diff. app. alts.	20	39		Log. ☽'s app. alt. 4·295652
Diff. of app. alts.	20	39	0	Difference	60	44		Log. 0·703749
Correction of sun's alt.	+	1	41	Sum	102	2		Log. 0·890605
Correction of moon's alt.	+	38	12					
				N. num.	776258			Log. 5·890006
Difference of true alts.	21	18	53	N. V. S.	068403			
Arc	81	3	48	N. V. S.	844661			
Seconds omitted	+		38					
True distance	81	4	26					

PROBLEM IV.

To find the Mean Time at Greenwich, answering to a Given True Distance between the Moon and Sun, or one of the Planets or Stars used in the Nautical Almanac.

RULE.

1. In one of the pages XIII. &c. to XVIII., of the month in the Nautical Almanac, opposite to the given day, or to that which immediately precedes or follows it, find two distances of the Moon from the given object, between which the given true distance will fall.

2. Take out the first† of these in order of time, the pro. log. between them (which is the pro. log. of their difference), and the three hourly interval at the head of the column in which the first distance is found.

3. From the pro. log. (Table XIX.) of the difference, between the first true distance and the given true distance subtract the pro. log. taken out of the Nautical Almanac. The remainder will be the pro. log. of a portion of time, which, added to the three hourly interval taken out, will be the Greenwich mean time required (nearly).

4. The Greenwich mean time thus found, is subject to a correction on account of the inequality of the Moon's motion, called the correction of second differences, the Table containing this correction, and the directions for applying it, are found on page 550, Nautical Almanac, examples and instructions on pages 572-3-4, Nautical Almanac.

EXAMPLE.

1844. August 10th. True distance of the Moon from Jupiter, required the corresponding Greenwich M. T. . . 94° 6′ 10″

	d.	h.	m.	s.		°	′	″	
N.A. p. XV., . .	10	3	0	0	First dis.	93	34	16	Pro. log. 2918
					Given dis.	94	6	10	
						31	54		Pro. log. 7515
Approximate interval .		1	2	27					Pro. log. 4597
Approximate Gwh. M.T.		4	2	27					
Cor. from p. 550, N.A.			+	3					
Greenwich M.T. required		4	2	30					

x of pro. logs. in N. A. 10 decreasing.

As the description of the Sextant, &c. with instructions for taking the observations necessary in finding the longitude by the lunar method, may be found in all the modern works on Navigation, it has been judged unnecessary to enter fully into that subject here. The Sextant case should be a fixture for the voyage, in a position out of the way of carelessness, and where it can be opened easily. It should be of that shape, size, and internal arrangement, to admit of the Sextant lying in it, with the Telescope screwed in ready for use, and the index at any part of the arc. All the tubes should be adjusted to the eye of the observer, and marked with a pencil or ink. The constant sliding in and out of a tube will slacken it so much, as scarcely to admit of its being touched without losing the focus.

A Navigator should never allow another person to touch his

† When the distance between the Moon and the object observed is increasing, the first distance in the Nautical Almanac will be less than the given true distance. When the distance is decreasing between the Moon and the object observed, the first distance in the Nautical Almanac will be greater than the given distance.

Sextant, otherwise its adjustment, or error, cannot be depended on, and that perhaps at a moment when most required. When running for land in unsettled weather, and in want of sights, those persons who have no cabin on deck, will find it convenient to have a common deal box, secured upon a skylight, or elsewhere, out of harm's way, to hold the Sextant all ready for use, and set to an expected altitude. A few seconds become of importance near the land in an uncertain climate. The Navigator, who is methodical in his arrangements, will obtain a set of sights for time or latitude, before the man without method gets his Sextant in hand.

The index error of the Sextant should be ascertained by the Sun's diameter, after observing distances, because a glare of light unfits the eye for the correct observation of a fainter object like the Moon.

When reading off the Sextant, it should be so held that the light may always fall upon the vernier in the same direction, both when ascertaining the index error and observing distances, particularly at night. A large error may arise by not attending to this point, as the position of the vernier alone furnishes the liability to a parallax. A person can become an expert and correct observer by practice only; therefore those who have not been accustomed to observe lunar distances, should not be discouraged, although their first attempts may not answer their expectations. By a steady perseverance, with a due attention to the directions in the *Epitomes* of Navigation, it will be found that the lunar distances may, in ordinary cases, be as easily observed as common altitudes, and so correctly that the longitude deduced from a set will seldom differ 10 miles from the truth. Perhaps some of the following hints may be of service to those who are desirous of acquiring expertness in the practice of observing the lunar distances.

1. When the Ship is pitching hard, the observer should place himself as near the midships as possible, provided the objects can be seen in that situation, the motion there being much less violent than it is near the head or stern; if the vessel be sailing nearly before the wind, and rolling very much, it will be useful to brace forward the yards and alter the course a little, during the time of taking the observations. The Sextant should be held as slack in the hand as is consistent with its safety; most observers at first grasp it too hard, which renders the hand very unsteady.

2. When observing with the *Direct* Telescope, great care must be taken that the line of sight be parallel with the plane of the instrument, otherwise the observed distance will be too great; the middle of the telescope should be set opposite to the middle of the transparent part of the horizon glass, and the observation made when the objects appear in this situation; for if the objects be observed too near either the inner, or outer side of the transparent part of the horizon glass, the observed distance will exceed the truth, therefore the least distance is always to be observed.

3. When the *Inverting* Telescope is used, the observation is to be made when the objects appear in contact in the middle of the space between the wires, these being placed parallel to the plane of the Sextant. This Telescope is in general to be preferred to the direct one, on account of its greater magnifying power: but an observer should accustom himself to the use of both, because, when the motion of a ship is very great, the distance may be more easily observed with the direct Telescope than with the inverting one. It appears rather difficult to most people at first to observe with the Inverting Telescope, but practice soon renders its use, in ordinary cases, as easy as the other. When observing with this telescope, should the objects get out of the field of view, the Telescope must not be moved in the direction in which the objects appear to move but in the contrary one: for instance, suppose the Sextant is held in a vertical position, when the objects appear to go out of the field of view at the upper part of the Telescope, they actually go out at the lower part, therefore the object-end of the Telescope must be moved downwards to bring the objects again into the field of view.

4. The best way to acquire confidence in the longitude, deduced from the lunar distances, is to make a practice of finding the longitude by the lunar method, when near any place, the longitude of which is well ascertained: then if the observation give the longitude *east* of the true longitude, the *observed distance* has been *too great*, or *too small*, according as the distance between the Moon and the other object is *decreasing* or *increasing*: but if the observation give the longitude *west* of the truth, the contrary is the case, that is, the observed distance must have been *too great* or *too small*, according as the Moon's distance from the other object is *increasing* or *decreasing*; and the error in the observed distance, in any case, will be about two seconds, for every minute of error in the longitude.

5. The following is the usual method of writing down a set of lunar distances, with the altitudes of the objects observed at the same time, and of finding the mean observed distance and altitudes.

	Times per watch.	Dist. ☉ and ☽	Alts. ☉'s l. limb.	Alts. ☽'s up. limb.
	3h. 0m. 16s.	91° 19′ 10	37° 58′	49° 58′
	1 25	19 40	37 43	50 15
	3 10	20 20	37 20	50 38
Divide by 3	4 51	59 10	121	51 sums.
Means - - 3	1 37	91 19 43	37 40⅓	50 17
Index errors - - - -		+ 2 50	— 2	0
Observed distance and alts.		91 22 33	37 38⅓	50 17

If one of the objects be at a sufficient distance from the meridian, for the purpose of finding the time with correctness, when the distance is observed, it is not absolutely necessary to take the time of each observation by a watch, because the mean time of observation may be

deduced in most cases from the altitude of one of the objects, observed at the same time as the distance, however, it is generally proper to use a watch as a check on the observations; and if the differences of the respective observations are not nearly in proportion to the several intervals of time, these observations should be rejected, and a fresh set taken.

6. When the mean time at ship is obtained from altitudes taken before or after the distances are observed, the respective times by watch must be carefully noted; to avoid error from the inaccuracy of the watch, the shorter the interval is the better. The interval by watch between the two observations (for mean time Greenwich and mean time ship) must be subtracted from, or added to, the Greenwich mean time obtained by lunar, the difference between which and the mean time ship will be the longitude for the meridian of the observations for the mean time ship.

7. In selecting objects to observe for lunars, the preference should be given to those which have equal distances on each side of the Moon. By attention to this, errors of observation will be obviated in deducing the longitude from their means. When possible, one of the objects in a lunar should be near the prime vertical, for the purpose of obtaining the time at ship correctly. A reference to Table IX. will point out the altitude requisite. (*See* p. 584, Nautical Almanac.)

8. The preceding remarks, and the following rule and examples are given on the supposition that no chronometer is on board, or available.

PROBLEM V.

The Latitude of a Place, and its Longitude by Account, being given, together with the observed Distance between the Moon and the Sun, or one of the Planets or Stars used in the Nautical Almanac, the observed Altitudes of the objects, and the estimated time of observation, to find the correct Longitude of the Place of Observation.

RULE.

1. To the estimated astronomical time at the ship, apply the longitude in time, by *addition* or *subtraction*, according as the longitude by account is *west* or *east*; this will give the Greenwich date,† to which reduce the necessary articles from the Nautical Almanac.

2. From the observed distance and altitudes, deduce the apparent distance and altitudes, and also the true altitude of the Sun, Moon, Planet, or Star, if the mean time is to be inferred therefrom.

3. If either of the objects observed be at a proper distance from the

† Convert the Greenwich date into mean time, as in Example I.

meridian at the time the distance is observed, find the mean time from the altitude observed at the time of taking the distance, by Problem I. or II., but if the Sun, Planet, or Star be near the meridian at the time of observing the distance, and the Moon's altitude at the time of observing the distance, cannot be depended upon for that purpose, find the mean time at ship by means of altitudes taken before or after the observation of the distance. At night, or during twilight, any stars may be observed which are on or near the prime vertical, for finding the mean time at ship.

4. From the apparent distance, and the apparent altitudes of the objects, together with the Moon's horizontal parallax (from page III. of the month in the N. A.), find the true distance, by Problem III.

5. Having the true distance, find the mean time at Greenwich, corresponding to that distance, by Problem IV.

6. The difference between the mean time at the ship (*See* Art. 6 preceding), and the mean time at Greenwich, is the longitude in time, and the longitude will be *east* or *west*, according as the time at the ship is *greater* or *less* than the time at Greenwich.

7. The method of finding the longitude by a planet is nearly the same as that employed in finding the longitude from a distance between the Moon and a Fixed Star. If the distance between the centre of the Planet and the enlightened limb of the Moon be observed, no correction will be necessary for the Planet's semidiameter. The effect of the Parallax of Jupiter or Saturn may be neglected; it is however proper, in most cases, to apply a correction to the apparent distance between the Moon and Venus, or Mars, for the effect of the Parallax of these Planets. If the apparent distance between the Moon and a Planet exceed 34°, the effect of the Planet's parallax on the distance may be found by the small table P. in Table XVIII., as follows:

Enter Table P. with the given distance and altitudes, using the altitude of the Planet for that of the Sun, and take out the corresponding correction; multiply this by the horizontal parallax of the Planet, and divide the product by 9, the quotient will be the effect of Planet's parallax on the distance, to be applied by addition or subtraction, according as the effect of the Sun's parallax would be applied, if the distance, &c. were of the Sun and Moon. For example,

Suppose the apparent distance between the Moon and Mars is 60°, the apparent altitude of the Moon 60°, and that of the Planet 40° when its horizontal parallax is 12·8″, required the effect of the parallax of Mars on the distance. At apparent distance 60° in Table XVIII. in the small table P. under the Sun's altitude 40°, and opposite to the Moon's 60°, is 6″ to be subtracted; now $6'' \times 12{\cdot}8'' = 76{\cdot}8''$, which being divided by 9 gives 8·53″, or 8½″, to be subtracted from the apparent distance, or from the third correction, before it be applied to the apparent distance.

1844. February 27d., 6h, 24m., 40s. App. T. S. the following observations of the Planet Venus and the Moon were taken to obtain the Longitude. At Noon, Lat. 3° 37′ N., Long. acct. 86° 4′ E., courses steered and distances run from Noon, W. by N., 4′, and W. N. W., 10′, height of the eye, 14 f., Bar. 29·70, Ther. 76. Alt. of Planet, ♀ 26° 23′ 20″ west of meridian. Alt. of Moon's U. L. 70° 19′. Dist. between ♀ and near limb of Moon, 67° 25′ 20″ — 5″ Index error.

	x	lat.		dep.
W. by N. 4′	0	8		3 9
W.N.W. 10′	3	8		9 2
	4	6		13 1
Lat. at N.	3° 37	0	Long. 86	4

Lat. at T. of obs. 3 42 N. -	85 51 E.
Eqn. T. (p. I., N.A.) noon 27d. decg.	13m. 6s·42
Pro. part of diff. for 1 hour for Gwh. D. 41m 16	— 42
Red. Eqn. T. to be added to app. T. -	13 6
Moons Semid. incg. Noon 27d. -	14′ 57″ 9
Pro. part. of diff. in 12h. for Gwh. D. -	+ 2
Augmentation, (Table IV.) - -	+ 14
Moon's red. semid. -	- 15 12
Planet's semid. - -	- + 6
Obs. Dist. — 5″ Index. error	67 25 15
App. dist. - -	67 40 33
♀'s obs. alt. 26° 23′ 20″	♀'s cor. for Ref. 1′ 54″
Dip. 14 f. — 3 37	Ther.— 7, Bar. + 1 — 6
♀'s app. alt. 26 19 43	— 1 48
♀'s cor. in alt. — 1 42	♀'s px. in alt. + 6
♀'s T. alt. 26 18 00	
P. D. - 85 16 38	Log. - ·00147
Lat. - 3 42 00	- - ·00091
Sum 115 16 38	
Half Sum - 57 38 19	- - - 4·72857
Diff. - - 31 20 19	- - - 4·71608
	h. m. s.
♀'s H. ∠ West 4 15 32	- = 9·44703
„ red. R. A. 0 47 41	
Comp. to 24h. - 1 35 13	
S.H. &c.from M.N. 6 38 26	
Retardation — 1 5	
Mean T. of obs. 6 37 21	
Moon's red.H. Px. 0° 54′ 56″	Log. - - 0·0554
♀'s app. alt 26 20 00	0·8130
App. dist. - - 67 40 33	Log. S. - 0·9662
1st. correction + 4 33 39	= 1·8346
2d correction + 5 21 12	
3d cor. 1′ 54″ / ♀'s Px. — 6 + 1 48	Pro. log. from N. A. (diff. with next log. 13 decreasing) -
T. dist. (less 10°) 67 37 12	
Dist. N.A. n. 27d 67 12 21	Corr. N. A. p. 550 diff. 13 -
Diff. of distances 24 51	
Mean time at ship -	- - - -
Long. by obs. in arc. -	85° 38′ 30″ E. - -
West of account	- 12½ miles.

	d. h. m. s.
App. T. S. - -	27 6 24 40
Long. in time, (East)	— 5 43 24
Greenwich date, in app. time	27 0 41 16
Red. Equa. T. - -	+ 13 6
Greenwich date, in M. T.	27 0 54 22
S.T.M.N. (p. II. N.A.) 27d. 22h. 25m. 43s·37	
Accelera. (see art. 2) long. E.	— 56·40
Red. S.T.M.N. -	22 24 46·97
	24
Comp. to 24h. -	1 35 13
Moon's Hor. Parx. noon, incg.	54′ 55
Corr. for Greenwich Date -	+ 1
Red. Hor. Parx. - -	54 56
Moon's obs. alt. U. L. -	70° 19′ 0″
Red. Semid. — 15′ 12″ / Dip. - — 3 37	— 18·49
Moon's app. alt. - -	70 00 0
♀'s Decl. 27d. incg. -	4 42 13·3 N.
Pro. part. of diff. in 24h. for Greenwich Date -	+ 1 9·1
Red. Decl. ♀ -	4 43 22
	90
Polar Dist. -	85 16 38
	h. m. s.
♀'s R. A. increasing -	0 47 31·36
Pro. part of diff. in 24h. for Gwh. Date - -	+ 9·93
Red R. A. ♀ -	0 47 41
- - - - - -	0·0554
☽'s app. alt. 70·0° - -	0·4870
log. T. -	1·3866
- - - - - -	= 1·9290
Pro. log. of diff. of dist. 24′ 51″ -	·8599
	·3429
h. m. s.	
Approx. Inter. 0 54 44	= pro. log. ·5170
M.T. Gwh. 27d. 0 54 47	
27d. 6 37 21	
Long. in time	= 5 42 34

1844. February 27d. 6h. 48m. 46s. App. T. S. The following observations were taken of the Moon and the Star *Regulus*, to obtain the long. The Star was E. of the meridian, and at nearly an equal distance E. of the Moon, as the Planet ♀ in the former Example was W. of the Moon. As the Ship was moving very slowly W.N.W., the lat. and long. were assumed to be 3° 42′ N. and 85° 50′ E., at the time of observation. Height of the eye 18ft., Bar. 29·70°, Ther. 76°. Obs. alt. Star, 22° 12′ 20″. Obs. alt. Moon. U. L. 70° 34′ 20″. Obs. distance between the Star *Regulus* and the remote limb. of Moon, 67° 16′ 57″, — 5″ Index error.

	d.	h.	m.	s.
Gwh. D. of last obs. M. T. -	27	0	54	22
Change of merid. to Westd. 1 mile		+		4
Interval by watch - - -		+	24	6
Gwh. D. of observation - -	27	1	18	32

	°	′	″
Obs. Dist. less 5″ index. error -	67	16	52
Moon's red. Semid. (remote limb) -	—	15	12
App. Distance - - - - -	67	1	40

	°	′	″
☀'s Obs. Alt. - -	22	12	20
Dip. 18 f. - -	—	4	8
☀'s App. Alt. -	22	8	12
☀'s cor. 2′ 19″ / Ther. 8, Bar. 1 7	—	2	12
☀'s True Alt. -	22	6	00
☀'s P. D. - -	77	16	25
Lat. - - -	3	42	00
Sum - - -	103	4	25
Half sum - -	51	32	12
Diff. - - -	29	26	12

	h.	m.	s.
☀'s H. ∠ West -	19	27	19
☀'s Red R. A. -	10	0	4
Comp. to 24h. S. T. / M. N. (last exp.)	1	35	13
	31	2	36
Less 24h. - -	24	0	0
Sid. h. &c. from M. N.	7	2	36
Retard. on 7h. 2m. 36s.	—	1	9
Mean T. of Obs. -	7	1	27

	°	′	″		
Moon's red. Hor. Px.	0	54	57	Log. -	·0553
☀'s App. Alt. -	22	8	0	,, -	·8839
App. Dist. -	67	1	40	Log. S.	·9641
1st. cor. - -	4	37	21	=	= 1·9033
2d. cor. - -	5	21	55	- - - - - - - - - -	= 1·9144
3d. cor. - -			2	14	
True Dist. (less 10°)	67	3	20		
Dist. from N. A. 27d. N.	67	42	32		
Diff. of distances -		39	12		

= - 9·49790

Log. - -	4·79380		
- -	4·69149		

Pro log. of diff. of dists. 39′ 12″ - - - 6620
Pro log. from N. A. (diff. with next log. 11 decg.) 2974
Approx. interval 1h. 17m. 45s. pro log. 3646
Corr. N. A. p. 550, diff. 11 + 3

Mean T. Gwh. by Lunar - - - - - - - - -	27	1	17	48
M. T. Ship - - - - - - - - - -	27	7	1	27
Long. by Obs. (in arc.) 85° 54′ 45″ E.	= Long. in time -		5	43	39

East of account 4′½

Moon's Semid. 27d. noon incg. 14′ 57″·9
Diff. in 12h. 4″·5 pro. for 1h. / ½ Gwh. D. - - } + ·4
Augmentation, (Table IV.) + 14
Moon's red. Semid. - 15 12

Moons Hor. Px. 27d. N. incg. 54′ 55″·0
Diff. in 12h. 16″·5 pro. for 1½h. G.D. + 1·8
Red. hor. px. - - - 54 57

Moon's obs. alt. U. L. 70 34 20
Red semid. — 15′ 12″ / dip. — 4′ 8″ } = — 19 20
Moon's app. alt. - 70 15

☀'s decl. p. 432, N. A. 12 43 37·51N.
Pro of annual var. for G. D. — 2·71
☀'s red. decl. - - 12 43 34·80
90
☀'s Polar dist. - 77 16 25

	h.	m.	s.
☀'s R. A. p. 432 N. A.	10	0	3·649
Pro of annual var. for G. D.	+		·503
☀'s red R. A. - -	10	0	4

Moon's app. alt. 70° 15′ - - ·4863
Log. T. 1·3728

The mean of these two Longs. by observation may be taken for the correct Longitude, viz. 85° 46½′ E.

1844. March 25d. 1h. 38m. 18s. app. T. S., the following observations of the Sun and Moon were taken to obtain the Long. in Lat. 51° 42′·5 N., Long. acct. 72° 40′ E. Bar. 29″·70. Ther. 76°. Eye at 17ft. Sun's alt. 61° 56′. Moon's alt. U. L. 47° 34′ E. of meridian. Distance of Sun W. of the Moon, 69° 45′ 53″ — 5″ index error.

	d.	h.	m.	s.
App. T. S.	25	1	38	18
Long. in time east	—	4	50	40
Gwh. D. in app. T.	24	20	47	38
Eqn. time		+	6	4
Gwh. D. in M. time	24	20	53	42

	°	′	″
⊙'s obs. alt.	61	56	0
Semid. + 16′ 3″—dip 4′ 1″	+	12	2
⊙'s app. alt.	62	8	

	°	′	″
Moon's Obs. Alt. U. L.	47	34	00
Red. semid. 14′ 59″ Dip 4 1	—	19	00
Moon's App. Alt.	47	15	00
Corr. table XXI. + 3″ for Ther.	+	36	4
Moon's True Alt.	47	51	4
Moon's P. D.	67	15	40
Lat.	15	42	30
Sum	130	49	14
Half sum	65	24	37
Diff.	17	33	33

	h.	m.	s.
Moon's H. ∠ West	21	3	18
Moon's Red R. A.	4	52	44
Comp. to 24h. S. T. M. N.	23	48	37
	49	44	39
Less	48		
Sid. h. &c. from noon	1	44	39
Retard.		—	17
Mean T. of Obs.	25	1	44	22

	°	′	″		
Moon's red. Hor. Px.	0	54	22	Log.	·0599
⊙'s App. Alt.	62	8	0	,,	·5135
App. Dist.	70	16	50	Log. S.	·9738
1st. cor.	4	8	57	=	1·5472
2d. cor.	5	14	19		
3d. cor. 1′ 22″—⊙'s Px.	4″	1	18		
True Dist. (less 10°)	69	41	24		
Dist. N. A. 18h. of 24d.	68	22	58		
Diff. of distances	1	18	26		

Log.					·03514
					·01653
					4·61923
					4·47950
=					9·15046

Eqn. T. app. noon 25d. decg.	6′	1″·76		
Diff. for 1h. 769 × 3½h.		+	2·46	
Red Eq. T. to be added to app. T.	6	4		
	h.	m.	s.	
S. T. M. N. 25d.	0	12	10·30	
Acceleration for long. east		—	47·75	
Red. S. T. M. N.	0	11	22·55	
	24			
Comp. to 24h.	23	48	37·45	

☽'s semid., midnight 24d. incg.	14	47′·1	
Pro of diff. in 12h. for 8h. 54m.	+	1·8	
Augmentation	+	10	
Moon's red. semid.	14	59	
Sun's semid.	16	3	
Obs. dist. less 5″ index error	69	45	48
App. Distance	70	16	50

Moon's Hor. Px. midnight incg.	54	15·3	
Pro. of diff. in 12h. for 8h. 54m.	+	6·7	
Red. hor. px.	54	22	
Moon's decl. incg. at 20h. of 24d.	22	43	35·1N.
Diff. for 10m. 8″·45 pro. for 53m. 42s.	+	45·3	
Moon's red. decl.	22	44	20
	90		
Polar dist.	67	15	40

	h.	m.	s.
Moon's R. A. 20h. of 24d.	4	50	48·45
Diff. for 1h. 2m. 9s·12 pro. for 53m. 42s.	+	1	55·53
Moon's red. R. A.	4	52	43 98
			·0599
Moon's app. alt. 47° 15′			·5941
		Log. T.	1·4456
		=	2·0996

Pro log. of diff. of dists. 1′ 18″·26	·3608
Pro log. from N. A. (diff. with next log. 7 decg.)	·3439
Approx. interval 2h. 53m. 8s. pro log.	·3646

Corr. N. A. p. 550, diff. 7			+	1
Correct interval		2	53	9
Time at Gwh. of dist. from N.A.	24	18	0	0
Mean T. Gwh.	24	20	53	9
M. T. Ship	25	1	44	22
Long. by Obs. (in arc.) 72° 48′ 15″ E.	Long. in time		4	51	13
East of account 8½′				

1844. March 25d. 6h. 52m. 30s. app. T. S. The obs. dist. between the Moon's remote limb and the Star *Regulus* E. of the Moon 71° 14′ 25″. Star's obs. alt. 49° 4′ E. of meridian. Eye 18ft. Moon's obs. alt. L. L. 58° 41′ at 17ft. Lat. 15° 53′ N. Long. acct. 72° 40′E. Ther. 72°.

	d.	h.	m.	s.
App. T. S.	25	6	52	30
Long. in time east	—	4	50	40
Gwh. D. in app. T.	25	2	1	50
Eqn. time		+	6	00
Gwh. D. in M. time	25	2	7	50

	°	′	″
Obs. dist.	71	14	25
Moon's red. semid. (remote limb)	—	15	2
App. dist.	70	59	23

	°	′	″
✱'s Obs. Alt.	49	4	0
Dip 18 feet	—	4	8
✱'s App. Alt.	48	59	52
Corr. 50″. Ther. — 2″		—	48
✱'s True Alt.	48	59	0
✱'s P. D.	77	16	0
Lat.	15	53	0
Sum	142	8	0
Half sum	71	4	0
Diff.	22	5	0

	h.	m.	s.
Star's H. ∠ West	21	10	54
✱'s Red R. A.	10	0	4
Comp. to 24h. S. T. M. N.	23	48	37
Sid. h. &c., from M. N. less 48h.	= 6	59	35
Retard. on 6h. 59m. 35s.	—	1	8·7
Mean T. of Obs.	6	58	26

	°	′	″
Moon's red. Hor. Px.	0	54	26
✱'s App. Alt.	49	0	0
App. Dist.	70	59	23
1st. cor.	4	16	33
2d. cor.	5	16	3
3d. cor.		1	21
True Dist. (less 10°)	70	33	20
Dist. N. A. noon 25d.	71	36	44
Diff. of distances	1	3	24

Mean T. Gwh.				25 2 8 3
M. T. Ship				25 6 58 26
Long. by Obs. (in arc.)	72°	35′	45″	E.
Long. by ⊙ and ☽	72	48	15	
	84			
Long. by mean of the two obsns.	72	42	0	E.

Log.	·01081	
	·01691	
	4·51117	
	4·57514	
	9·11403	
Log.	·0594	
,,	·5822	
Log. S.	·9756	
	= 1·6172	

	h.	m.	s.
Eqn. T. app. noon 25d. decg.	0	6	1·76
Diff. 1h. 770 × 2h. 2m.	-	—	1·57
Red Eqn. T. to be added to app. T.	- 0	6	0
S. T. M. N. 25d.	0	12	10·30
Acceleration for long. east		—	47·75
Red. S. T. M. N.	0	11	22·55
	24		
Comp. to 24h.	23	48	37

	′	″
☽'s semid. incg.	14	49·6
Diff. in 12h. 3″·1 pro for 2h. 8m.	+	·3
Augmentation		12
☽'s red semid.	15	2
☽'s Hor. Px. incg.	54	24·4
Diff. in 12h. 11″·7 pro for 2h. 8m.	+	2
Red. hor. px.	54	26

	°	′	″
Moon's obs. alt. L. L.	58	41	0
Red. Semid. + 15′ 2″ — dip 4′ 1″	+	11	
Moon's app. alt.	58	52	0
✱'s decl. p. 432 N. A.	12	43	37·51N.
Pro part of ann. var.		—	3·99
✱'s red. decl.	12	43	33·52
	90		
Polar dist.	77	16	0

	h.	m.	s.
✱'s R. A. p. 432, N. A.	10	0	3·649
Pro part of ann. var.	-	+	·740
✱'s red. R. A.	10	0	4

	-	·0594
Moon's app. alt. 58° 52′	-	·5275
	Log. T.	1·4628
	=	2·0497
Pro log. of diff. of dists. 1° 3′ 24″	-	·4532
Pro log. from N. A.	-	·3052
Approx. interval 2h. 8m. 1s.	=	·1480
Corr. p. 550, N. A.	+	2

Long. in time 4 50 23 W. of acct. 4′½

In finding the longitude by a Planet and the Moon, the observations may often be made soon after sunset, or shortly before sunrise, when the twilight is so strong, and the horizon so well defined, as to admit of the altitudes of the objects being observed with great accuracy: the angles may frequently be read off the instruments without the assistance of artificial light; also, the latitude by a Star may be obtained at the same time, to calculate the mean time at ship.

In the foregoing Examples, it has been supposed, that the altitudes of the objects were found by observation, it, however, sometimes happens in the night, that the distance between the Moon and a Star may be very correctly observed when the horizon is so obscure as to render the observed altitudes rather uncertain. Also, in the practice of the lunar observation on shore, it is not always convenient to observe the altitude at the same time with the distance; in such cases, it is necessary to find the altitudes by calculation. For the computation of an altitude, it is necessary to have the following elements:

1. The latitude of the place, and its longitude by account.

2. The apparent time at that place when the Sun's altitude is required. The mean time at that place when a Star's, Planet's, or the Moon's altitude is required.

3. The declination of the object, and also its right ascension, together with the sidereal time mean noon, if the object, whose altitude is required, be the Moon, a Star, or a Planet.

PROBLEM VI.

Given the Latitude of a place, and its Longitude by account, together with the Mean or Apparent Time, to find the True Altitude of a known Celestial Object.

RULE.

1. Find the horary distance of the object from the meridian. This, if the object be the Sun, is the interval between the given apparent time and noon; but if the object be the Moon, a Planet, or a Star, convert the given mean time into sidereal hours, &c., by Table A, and add to it the sidereal time mean noon, the sum, rejecting 24 hours if necessary, will be the right ascension of the meridian; the difference

between this and the right ascension of the given object, will be its horary distance from the meridian.†

2. If the latitude of the place, and the declination of the given object, be both North, or both South, their *difference* will be the meridian Zenith distance of the object; but if one be North and the other South, their *sum* will be the meridian Zenith distance.

3. Add together the logarithm of the horary angle of the object, Table XIII., the constant logarithm 6·30103, and the cosines of the latitude and declination, Table XII.; the sum of these 4 logarithms, rejecting 10s. from the Index, will be the logarithm of a natural number, in Table XXIV.

4. Find the natural versed sine, Table XXV., of the meridian zenith distance, add to it the natural number found, their sum will be the natural versed sine of the zenith distance of the object at the time given, which, subtracted from 90°, will give the true altitude required.

5. As the apparent altitudes are used in correcting a lunar distance, it is necessary to reduce the true altitudes to the apparent altitudes; this, when the object is the Sun or a Star, is done by taking the correction for the given altitude, from Table VI., and adding it to the true altitude, the sum will be the apparent altitude. Thus the apparent altitude of a Star, when its true altitude is 17° 0′, would be 17° 3′ 5″, or the apparent altitude of the Sun, when the true altitude is 17° 0′, is 17° 2′ 56″. When the apparent altitude of a Planet is required, subtract the parallax in altitude from the refraction previous to adding it to the true altitude. But when the true altitude of the Moon is to be reduced to the apparent altitude, it will be necessary to proceed as follows:

6. To the secant of the Moon's true altitude, Table XI., add the proportional logarithm of the Moon's horizontal parallax, the sum will be the proportional logarithm of the Moon's parallax in altitude, from which subtract the refraction in altitude (the Star's correction in altitude, Table VI., is the refraction in altitude of any object); the remainder being subtracted from the true altitude will leave the apparent altitude.

The elements for the following Example are selected from Example II, Problem V., being reduced for the meridian of observation.

† When the right ascension of the given object is less than the right ascension of the meridian the hour angle of the object is West, when it is greater the hour angle is East.

EXAMPLE.

1844. Feb. 27d. 7h. 1m. 27s. mean time, latitude 3° 42′ N., longitude 85° 50′ E., sidereal time mean noon, 22h. 24m. 47s., Moon's right ascension 5h. 19m. 12s., declination N. 23° 2′ 16″, horizontal parallax 54′ 57″: required Moon's true and apparent altitudes.

	h.	m.	s.		m.	s.						
M. T. - -	7	1	27	7h. A. =	1	8·10						
Acceler. Table A +	1		8·33	1m. „ =		·16						
				27s. „ =		·07						
Sid. h. &c. from N.	7	2	35									
S. T. M. N. -	22	24	47									
Sum. —24h - =	5	27	22	R. A. of Merid.								
☽'s R. A. -	5	19	12									
☽'s H. ∠ - -		8	10	Log. Table XIII. -			6·50162					
				Constant - -			6·30103					
☽'s Decl. N. -	23°	2′	16″	Cos. - - -			4·96391					
Lat. N. -	3	42	0	Cos. - - -			4·99909					
Natural Number -				- - -		583	= 2·76565					
☽'s Merid. Z. D.	19	20	16	N. V. S.		056417						
☽'s Z.D. at time of observation -	19	26	18	N. V. S. -		057000						
	90	0	0									
				Pro. log. ☽'s Hor. Par. - - - - -								·5153
☽'s True alt. -	70	33	42	Sec. - - - - - - - - -								·4778
☽'s cor. in alt.		17	57									
							18′	17″	Par. in Alt. =			·9931
☽'s App. alt.	70	15	45				—	20	Ref.			
							17	57	☽'s cor.			

REMARKS.

I. If great accuracy were required, the operation of finding the Moon's correction in altitude ought to be repeated, using the Moon's apparent altitude, as found above, in place of the true altitude, and then subtracting the correction thus found from the true altitude; however, one operation is generally quite sufficient for the purpose of finding the Moon's apparent altitude.

II. If an object be near the meridian, in bearing or azimuth, when its altitude is to be computed, any probable error in the time will not cause a material error in the altitude; but any error in the latitude will, in this case, cause nearly an equal error in the altitude.

III. If the object be near the prime vertical, that is, near the east or west, at the time its altitude is to be found by calculation, any probable error in the latitude of the place will cause very little error in the altitude; but an error in the time will then greatly affect the altitude. In this case, the error in the altitude, arising from an error of 1 minute of time, will, in places near the equator, be nearly 15 minutes of a degree; in high latitudes the error is less.

IV. When the object is considerably distant, both from the meridian and prime vertical, its computed altitude is affected by an error either in the latitude or time; but the error of altitude, arising from an error in the latitude, will not be so great as when the object is near the meridian, nor will the error, occasioned by an error in the time be so great as when the object is near the prime vertical.

V. The apparent altitudes being found by computation, the true distance and mean time at Greenwich are to be found in the same manner as before: but it very rarely happens at sea that the altitude of the Moon may not be observed with sufficient accuracy, for the purpose of clearing the distance of parallax and refraction, nor is it often necessary to calculate the altitude of a Star; however, as any given error in the altitude of the Star will, in general, cause a greater error in the computed distance, than an equal error in the altitude of the Moon, it is proper, when the observed altitude of the Star is at all uncertain, to compute its altitude; by substituting Planet or Star, for Moon, in the foregoing Example: the form answers for either.

In cases where there is not a sufficient number of observers to take the distance, and the altitudes of the objects, at the same time, it is necessary to observe the altitudes both before and after the time of taking the distance, and then reduce them, by the Rule of Proportion, to what they would be at the time the distance is observed. This may be done in the following manner:

Times.		Obs. alt. ⊙'s l. l.		Times.		Obs. alt. ☽'s up. l.	
h. m. s.	Diff.			h. m. s.	Diff.		
1st. 3 24 16	m. s.	27° 14′	Diff.	1st. 3 24 58	m. s.	31° 24′	Diff.
	7 34		1° 19′		8 23		0° 35′
2d. 3 31 50		25 53		2d. 3 33 21		31 59	

	Times.	Dists. ⊙ and ☽'s nearest limbs.
	h. m. s.	
	3 26 14	68° 34′ 50″
	27 49	35 40
	29 31	36 30
Sums	23 34	120
Means	3 27 51	68 35 40

Here the interval between the time of observing the first altitude of the Sun, and the mean of the times, when the distances were observed, is 3m. 35s.; and as the Sun's altitude decreases 1° 19′ in the space of 7m. 34s. the change in 3m. 35s. will be 0° 37′, which is to be subtracted from the first altitude, because the altitude is decreasing: hence the altitude of the Sun's lower limb, corresponding to the mean distance, is 26° 37′.

In the same manner the altitude of the Moon's upper limb, corresponding to the mean distance, is found to be 31° 36′, we have therefore the following set of observations:

Time per watch of obs.	Obs. dist. ⊙ & ☽'s nrst. limbs.	Obs. alt. ⊙'s l.	Obs. alt. ☽'s up. l.
3h. 27m. 51s.	68° 35′ 40″	26° 37′	31° 36′

From these, the Greenwich mean time is to be deduced in the same manner as before. It will be proper, however, to find the mean time at ship by a set of altitudes, taken as soon as possible before or after those altitudes, which are to be employed in correcting the distance. It seldom happens but the altitudes of at least one of the objects, may be observed at the same time as the distances; in this case, it is generally proper to observe the altitudes of the Sun or Star along with the distances, and then deduce the altitude of the Moon, as in the foregoing Example. (*See* Art. 6, p. 18).

To form an estimate of the respective values of two sets of observations of objects on opposite sides of the Moon, or of different objects on the same side, compare the relative intervals of mean time obtained by observation, with the interval estimated as in the following example, taken from pp. 20 and 21.

Estimated time.				M. T. S. by obs.			M. T. by Distances.		
h.	m.	s.		h.	m.	s.	h.	m.	s.
0	54	22	by ☿	6	37	21	0	54	47
1	18	32	„ ✱	7	1	27	1	17	48
Interval	24	10			24	6		23	1

As the interval of time measured by the hour angles, and that estimated, agree nearly, the hour angles may be esteemed as correct. The interval by distances is too small, being 1m. 9s., or 17′¼ of longitude less than the estimated interval; but this difference need not be regarded, and the mean of the two sets may be taken for the longitude. Had the difference been double that amount, or more, the second set would have been entitled to the preference, the pro log. from the N. A. being of the first distance 3429=1h. 21m. 44s., and the second 2974=1h. 30m. 45s. (*See* N. A. p. 574, 2d paragraph.)

ON FINDING THE

LONGITUDE BY CHRONOMETERS.

THIS method of finding the longitude depends on the same principle as the lunar method, that is, on being able to find the respective *times* at two meridians, for the same instant of absolute time, when the difference of these times will give the difference of longitude between the two meridians. For example:

Suppose a Chronometer that keeps mean time exactly, be set to mean time at Greenwich, and then taken to another meridian, where the mean time is found, by observation, to be 4 hours at the instant that the time by the Chronometer is only 2 hours; we know that the place of observation is 30° E. of Greenwich, because the time at that place is 2 hours farther advanced than the time at Greenwich: but if the time shewn by this Chronometer were 4 hours at the instant, the mean time found, by observation, is only 2 hours, then the longitude of the place is 30° W. of Greenwich, because the time at Greenwich is 2 hours farther advanced, than the time at the place of observation.

A Chronometer generally deviates something from mean time in its rate of going; the portion of time which it gains or loses on mean time, during 24 hours, is called its Daily Rate, or simply the *Rate*, and what a Chronometer is fast or slow, for mean time at a given meridian, is called its *Error* for that meridian. Those who reckon the longitude from the meridian of Greenwich, should always have the errors of their Chronometers for that meridian. If the *rate* of a Chronometer and its *error*, for any particular time be known, the *error* for any other time is found by multiplying the rate by the number of days between the times. Thus, let the rate of a Chronometer be 5·4s. gaining, and it is found to be fast for mean time at Greenwich, at noon, on the 5th of June, 0h. 11m. 31s.; the error on the 2d of July, at noon, would be 0h. 13m. 57s.; for here the number of days elapsed is 27, and 5·4s. × 27 = 145·8s. or 2m. 26s., and 0h. 11m. 31s. + 2m. 26s. = 0h. 13m. 57s.

It is evident, that when the error is wanted for any other time than noon at Greenwich, a proportional part of the daily rate must be allowed.

When only one or two Chronometers are used, the daily rate or rates should be carried on in the book in which the sights for time, &c. are worked. When there are two, or three, or more, the longitude may be deduced from the mean of their Greenwich dates, or the preference will be given to either, according to its performance, when in the maker's hands, and his reputation for skill in manufacture and adjustment.

When there are two, three, or more Chronometers, irregularities in their rates may be detected by comparison of each with the others, unless they should all alter their rates to the same amount. The difference of the daily comparison between any two watches should be the same as the difference of their daily rates given, otherwise one or the other has altered its rate, possibly both.

When two watches maintain the proper difference of daily comparison, and a third watch varies from both in an equal amount of difference of comparison, it may be presumed that the two have maintained their given rates, and that the third alone has altered; for it appears to be scarcely possible that two watches should be so exactly alike, as to alter their rates to the same amount from the same cause; for instance, a change of temperature may make three watches gain; but it has not been proved that three watches will each gain 2s., or any other amount; neither does it appear that they alter their rates, from the same cause, in a ratio to their respective given rates.

When a comparison book is kept, the Barometer and Thermometer (*See* Art. 6, p. 52), and state of the weather should be noted in it. The uneasy motion of a ship will, at times, have an effect upon the rates of Chronometers.

The following form for a comparison book may be extended for any number of watches :—

	Day.	Bar.	Ther.	No. 858, losing 5s „ 279, „ 7s	Comparison Daily.	Difference of Comparisor.	
				h. m. s.	m. s.		
1844 Oct.	♄ 7	29·10	66	9 17 0 9 10 58·5	6 1·5		Fine.
	☉ 8	29·15	60	9 20 0 9 13 58·5	6 1·5		Gales.
	☾ 9	29·20	57	9 13 0 9 6 58 5	6 1·5		Rain.
	♂ 10	29·60	60	9 31 0 9 25 0·5	5 59 5	— 2s	Squally.
	☿ 11	29·0	62	9 34 0 9 27 57	6 3	+ 3·5	Gales.
	♃ 12	29·20	61	9 35 0 9 28 58·5	6 1·5	— 1·5	Gales, much Sea on.
	♀ 13	29·70	60	9 40 0 9 33 59·5	6 0·5	— 1	Moderate.

As the above is only inserted for the sake of the form, it is unnecessary to make any remark, except, that the difference of comparison ought to have been 2s greater every day.

PROBLEM VII.

Having a Chronometer, of which the error for Mean Time at Greenwich is known, and also the Latitude of a place, to find the Longitude of that place.

RULE.

1. When the Sun, Moon, a Planet, or a known Star, is at a proper distance from the meridian, take a set of altitudes and note the corresponding times by the Chronometer; to the mean of the times by the Chronometer, apply its error for mean time at Greenwich, by *addition* or *subtraction*, according as it is too *slow* or too *fast*, the sum or difference will be the Mean Time at Greenwich when the observation is made.

2. The Mean Time at Greenwich obtained by Chronometer, is from midnight to noon following, according to civil reckoning, therefore to obtain the Astronomical Greenwich Date at any moment during that interval, 12 hours must be added to the time shewn by Chronometer. In the following example, the astronomical Greenwich date is 1d. 19h. 28m. 56s. If the Sun's declination and the equation of time were to be reduced by logarithms the Astronomical Time would be requisite. The Greenwich Date by Chronometer should always be employed to reduce the elements from the Nautical Almanac, (*See* Art. 2, Introduction.)

3. From the mean observed altitude, deduce the true altitude.

4. With the Latitude of the place, the true altitude, and the declination of the object, find the mean time by Problem I. or II. according as the altitude of the Sun, the Moon, a Planet, or a Star has been observed. The difference between this Mean Time and the Mean Time at Greenwich, is the Longitude of the Ship in time, and the Longitude will be *east* or *west*, according as the time at the Ship is *greater* or *less* than the time at Greenwich.

EXAMPLE I.

1844. January 2d., 9h., A. M., civil time, the following observations were taken to obtain the Long. by Chronometer, and the variation of the compass. Bar. 29·75, Ther. 68°, Sun's magnetic Azimuth, N. 108° E. Error of Chronometer 18m. 45s. slow for Greenwich mean time. The true course and distance run from the time of observation till apparent Noon, was E. ¼ S. 15′, when the Lat. by observation was found to be 37° 0′ 30″ S.

	h. m. s.
Time by Chronometer	7 10 11
Error slow	+ 18 45
M. T. Greenwich, (A. M.)	7 28 56
	12 — —
Time from nearest Noon	4 31 4
	° ′ ″
⊙'s alt. l. l.	49 7 20
Dip 14 F.	— 3 37
	49 3 43
⊙'s corr. 44″ / Ther. — 2	— 42
	49 3 1
⊙'s semid.	+ 16 17
⊙'s true alt.	† 49 19 18
P. D.	67 0 0
Lat.	36 59 —
Sum	153 18 0
Half Sum	76 39
Diff.	27 20
Az.	9 39
App. T. obs. —12h.	‡ 9 1 28
Eq. T.	+ 3 58
M. T. ship	9 5 26
M. T. Gwh. by Chro.	7 28 56
Long. at time of obs. in time	1 36 30
„ „ in arc	24° 7′ 30″
Dep. 14·9 = diff. of long.	+ 18 30
Long. at app. noon	24 26 E.

	° ′ ″
Lat. obs.	37 0 30
Co. E. ¼ S. 15′ = dep. 14·9 diff. lat.	— 1 30
Lat. worked back to time of obs.	36 59
Decl. mean noon 2d. decg. S.	22 58 52 2
Diff. for 1 h. 12″·34 × 4h. 31m.	+ 55·5
⊙'s Red. decl.	22 59 48
	90
⊙'s Polar Dist.	67 12

Eq. T. M. noon, 2d. incg.	4m3·49s
Diff. for 1h. 1s·181 × 4h. 31m. =	— 5·33
Red. Eq. T. add to App. T.	3 58

			Sec. ·18583
Log.	·03596		
	·09756		·09756
—	4·36342		4·36342
—	4·66197		
		cos.	4·99381
	9·15891	=	9·64062
			5h. 31m. 6s.

⊙'s true azimuth — N. 82° 46′ E.
⊙'s magnetic do. — § N. 108 E.
Variation west — 25 14

† The seconds are rejected above as they would only make a difference of about 2s. in the horary angle, and for general purposes at sea, working to the nearest minute is sufficient.

‡ Twelve hours are rejected from the apparent astronomical time by observation to compare it with the time shewn by Chronometer.

§ In South Lat. read the Sun's Azimuth by compass from the north point as above, and in North Lat. from the South, because the true Azimuths are calculated by this method, from the North in South Lat., and from the South in North Lat.

EXAMPLE II.

1844. February 12d. 6h. 40m. apparent time (astronomical), the altitude of the Planet *Venus*, West of meridian, was observed to obtain the Long. by Chronometer. Bar. 29·64, Ther. 80°, Lat. 1° 48′ S. having been obtained by a meridian alt. of the Star *Aldebaran* long. account 87° 30′ E.

	d.	h.	m.	s.		h.	m.	s.
Time by Chronometer	0	0	49	46	S.T.M.N. 12d	21	26	35·07
Error		+	14	8	Accel. for long. E.		—	57·49
Greenwich date	12	1	3	54	Red. S.T.M.N.	21	25	37·58
♀ Decl. S. 12d. decg.		3°	8′	55″·9	Comp. to 24h.	2	34	22·42
x in 24h. 31′ 17″ pro for 1h. 4m.		—	1	23·4				
		3	7	32·5	R. A. ♀ 12d. incg.	23	41	28·17
		90			x in 24h. 4m. 26·33s. pro for 1h. 4m.	+		11·83
♀ P. D.		86	52	27·5	Red. R. A. ♀	23	41	40
Obs. alt. 18 f.		20	32	0				
Dip		—	4	8				
Refrac. 2′ 33″ / Ther. — 11 = 2·22		20	27	52				
♀ Px. in alt. + 6		—	2	16				
True alt.		20	25	36				
P. D.		86	52	27	Log. ·00064			
Lat.		1	48		·00021			
Sum		109	6	0				
Half Sum		54	33		4·76342			
Diff.		34	7	24	4·74893			
♀ H. ∠		4h.	38m.	32s.	= 9·51320			
♀ R. A.		23	41	40				
Comp.		2	34	22·42				
Sum less 24h.		6	54	34·42				
Retardation		—	1	7·92				
M. T. of observation		6	53	26				
M. T. Gwh.		1	3	54				
Long. in time		5	49	32	= arc 87° 23′ E.			

REMARK.

Sometimes the Moon is on, or near to the prime vertical, when the Sun is on the Meridian, by taking her altitude at such times, errors of latitude by account may be avoided in calculating her horary angle.

EXAMPLE III.

1844. October 6d. apparent noon,† in latitude 38° 6′ N. long., account 39° 30′ W. The alt. of Moon's upper limb 26° 30′ 57″, west of meridian. Eye 16 feet. Moon's magnetic azimuth S. 106° W., Bar. 30·06, Ther. 71°. Time by Chronometer corrected for error 2h. 30m. 32s. P. M. Greenwich.

	d.	h.	m.	s.					h.	m.	s.
Time by Chro., or Gwh. D.	6	2	30	32	S. T. M. N., 5d.				12	57	1·96
Moon's semid. 6d. incg.			15′	11″·7	Accel. long W.					+	25·95
Var. in 12h. 6·2 pro for 2½h.			+	1 ·3							
Augmentation			+	7·	Red. S. T. M. N.				12	57	27·91
Red semid.		15	20		Comp. to 24h.				11	2	32·09
Moon's decl. at 6d. 2h. decg.		14°	48′	43″·7 N.	Moon's Hor. Px. incg.					55′	45″·5
x for 10m. 88″·62 × 3·32 =		—	4	30 ·6	Var. in 12h. 22″·8 pro for 2½h.					+	4 ·7
Subtract from 90°		14	44	13	Red. Hor. Px.					55	50
D's P. D.		75	16						h.	m.	s.
Moon's obs. alt. U. L.		26	30	57	Moon's R. A. 6d. 2h.				8	24	28·38
Semid. and dip 3′ 53″ =		—	19	13	x for 1h. 2m. 4·89s. pro for 30m. 32s.				+	1	3·55
Moon's app. alt.		26	11	44	Moons red. R. A.				8	25	31·93
Moon's corr. Table XXI.		+	48	15							
True alt.		27	00				Sec.		·05012		
P. D.		75	16		Log.		·01452				
Lat.		38	6				·10406		·10406		
Sum		140	22								
Half Sum		70	11				4·53021		4·53021		
Diff.		43	11				4·83527				
Az.		5	5					Cos.	4·99829		
		h.	m.	s.							
D's H. ∠		4	28	6	=		9·48406	=	9·68268		
„ R. A.		8	25	31·93					h.	m.	s.
Comp. to 24h.		11	2	32·09					5	51	34
		23	56	10	D's true azimuth			-	S. 87° 53′ 30″ W.		
Retardation, 23h., &c.		—	3	55	„ mag. azimuth			-	106		
M. T. ship	5	23	52	15	Variation, west			-	18°		
M. T. Gwh.	6	2	30	32							
Long. in time		2	38	17							
In arc		39	34	15 W.							

† As the equation of time is subtractive from apparent time, the mean astronomical date at the meridian of observation is 5 days, &c., therefore the S. T. M. N. is taken out for 5 days.

The nearest minutes of the true altitude, polar distance, and latitude may be used in finding the time, this being sufficiently exact for merely finding the Longitude at sea; but if the time is required for the purpose of finding the error of a Chronometer, or, if the relative situations of two or more places are to be found by a Chronometer, greater attention to accuracy is requisite, this will be illustrated hereafter.

An example of finding the Longitude by Chronometer, and the Mean Time deduced from Altitudes of a Fixed Star is unnecessary. *See* Problem II., and precept I. of the Rule, Problem VII.

We shall now proceed to give some directions for finding the Errors and Rates of Time-keepers. This is a subject that ought to be well understood, for unless the Navigator knows how much a Chronometer differs from mean time at Greenwich, at any given time, he can place no confidence in the Longitude deduced therefrom.

ON FINDING

THE ERRORS AND RATES

OF

CHRONOMETERS.

THERE are various modes of finding the error and rate of a Chronometer, such as by comparing it with a well-regulated astronomical clock, by transits of the Sun or a fixed Star over the meridian, or by equal altitudes of the Sun. These methods, however, are not in general so well adapted to the use of the practical navigator as the following, of which we shall give some examples.

1. By a set of altitudes of the Sun, taken when that object is at a proper distance from the meridian.

2. By a set of altitudes of a fixed star, taken when the Star is near the prime vertical.

3. By the lunar distances.

The first of these methods is the one most used by seamen. In high latitudes, however, when the latitude of the place and the declination of the Sun are of contrary names, the second method will be found more correct, because a Star may always be chosen at a proper height, and at the same time near the prime vertical. The third method is only useful at sea, but there it is the only one that can be employed with advantage; it therefore ought to be well understood by every person possessed of a time-keeper.

Altitudes carefully observed in the usual way, may be employed to find the error of a Chronometer, but altitudes taken by means of an artificial horizon, should always be preferred when the observer is on

shore, or the ship perfectly steady; indeed, it is only in this way that altitudes of the Stars can be employed with success in finding the rate of a time-keeper.

The artificial horizon, generally used, consists of a quantity of quicksilver, put into a shallow trough or vessel, having a glass roof to prevent the wind from disturbing the surface of the mercury. Another kind consists of a smooth reflecting surface, which is a perfect plane, and adjusted horizontally at the time of observation by means of screws and a spirit level. If a person be not in possession of either of these horizons, a little clean tar, oil, or treacle, put into a basin, will answer very well as an artificial horizon; if the wind is strong, the basin should be covered with a piece of fine muslin, or gauze. Water makes an excellent artificial horizon, when there is little or no wind, or when kept steady in the basin by means of a gauze cover.

To observe the altitude of the Sun in an artificial horizon, let the observer have the horizon directly betwixt him and the Sun, and place himself at such a distance as to see the Sun's image in the quicksilver, or other reflecting surface; then having the proper coloured glasses turned down, on each side of the horizon glass of the Sextant, keep the Sun's image in the middle of the field of the telescope, and move the index forward until the Sun's image, reflected from the index glass of the Sextant, be brought in contact with that first seen in the artificial horizon; then, if the one image be made exactly to cover the other, the Sextant (supposing it to have no error) will give twice the apparent altitude of the Sun's centre. But instead of making the one image cover the other, it is generally better to bring their limbs in contact, then half the angle of the nearest limbs is the apparent altitude of the Sun's lower limb, or half the angle between the farthest limbs is the apparent altitude of the Sun's upper limb.

The altitude of a fixed Star is observed in the same manner, only no coloured glasses are required; and as the Stars have no sensible diameter, half the angle given by the instrument is the apparent altitude of the Star.

FIRST METHOD

To find the Error and Rate of a Chronometer by altitudes of the Sun observed by means of an Artificial Horizon.

RULE.

1. When the Sun is near the prime vertical, or at least 5 points of the compass distant from the meridian, and his altitude at the same time not less than 8°, nor greater than 60°; take a set of altitudes, and note the corresponding times by the Chronometer; to the mean

altitude, apply the index error of the Sextant, half the sum or difference will be the apparent altitude of the Sun's *upper* or *lower* limb, according as the *farthest* or *nearest* limbs of the Sun's images have been brought into contact.

2. With the apparent altitude of the Sun's limb, take the correction of the Sun's altitude from Table VI.; this correction being subtracted from the apparent altitude of the observed limb, will leave the true altitude of that limb, to which apply the Sun's semidiameter, by *addition* or *subtraction*, according as the *lower* or *upper* limb of the Sun has been observed, the sum or difference will be the true altitude of the Sun's centre.

3. With the Sun's true altitude and declination, together with the latitude of the place of observation, find the apparent and mean time, by Problem I. The difference between this time and the mean of the times given by the Chronometer, will be the *error* of the Chronometer for mean time at the meridian of the given place, and for the time of observation.

4. A few days after the first error has been found, let the error of the Chronometer be again found in the same manner; divide the difference of these errors, or their sum, if the one be fast and the other slow, by the number of days elapsed, the quotient will be the daily *rate*, which will be *gaining* or *losing*, according as the second observation shews the watch to be *gaining* or *losing* on mean time.

After having found the rate, the last found error should be reduced to the error for mean time at Greenwich, as follows:

1. When the place of observation is in *east* longitude, and the error of the Chronometer *fast* for mean time at that place, add the longitude in time to the error of the watch, the sum will shew how much the watch is fast for mean time at Greenwich; but when the Chronometer is *slow* for mean time at the place of observation, the difference between the longitude in time and the error of the watch, will be its *error* for mean time at Greenwich, which will be *fast* when the longitude in time exceeds the error of the watch for the meridian of observation, but *slow* when that error of the watch exceeds the longitude in time.

2. When the longitude of the place is *west*, and the Chronometer *slow* for mean time at that place, the sum of its error and the longitude in time, will be its error *slow* for mean time at Greenwich; but when the watch is *fast* for mean time at the place of observation, the difference between the longitude in time, and the error of the watch, will be its *error* for mean time at Greenwich, *fast* when the error of the watch for the meridian of observation is greater than the longitude in time; but *slow* when the longitude in time exceeds that error of the watch.

EXAMPLE I.

1844. May 18d. 20h. 26m. M. T. at Bombay, latitude 18° 55′ 48″ N., longitude 72° 54′ 45″ E. The following Altitudes were taken in an artificial horizon to find the error of a Chronometer. N° 279. Ther. 80°.

								d.	h.	m.	s.
						M. T. of obsn.		18	20	26	00
						Long. E. -		=	4	51	39
						Gwh. D. -		18	15	34	21
Times by No. 279.			Alts. ⊙								
h.	m.	s.	°	′	″	Time A.M. 19d.			8	25	39
3	30	20	80	52	50						
	30	53	81	7	50	⊙'s Decl. 19d. incg. -			19°	51′	11″·7 N.
	31	23	81	22	30	Diff. for 1h. 32″·28 × 8h. 25m.			= 4	32	·2
Divide by 3,			= 156	by 6†		243 23 10	Red. decl. - -		19	46	39·5
									90	0	0
Mean -	3	30	52								
⊙ App. alt. - -						40 33 51	P. D. - -		70	13	20
⊙ Corr. 1′ 0″											
Ther. — 5 - -						— 55					
							Eqn. T. 19d. decg. - -			m.	s.
						40 32 56	Diff. 107 × 8h. 25m. -			=	·90
⊙ Semid. - -						+ 15 49					
							Red. Eqn. T. -			3	47·52
⊙ T. alt. - -						40 48 45					
P. D. - - -						70 13 20	Log. -		·02640		
Lat. - - -						18 55 48	Log. -		·02415		
Sum - - -						129 57 53					
Half sum - - -						64 58 56	Log. -		4·62624		
Diff. - - -						24 10 11	Log. -		4·61218		
						h. m. s.					
App. T. - - -						20 30 38	-		= 9·28897		
Eqn. T. - - -						— 3 47					
M. T. -	8	26	51	=		‡ 20 26 51					

Error of No. 279 4 55 59 slow for merid. of observation.

At 25d. 20h. 30m. mean time, the error of the same Chronometer was found to be slow for the same meridian 4h. 56m. 50s., being 51s. slower than at the first observation. The interval between the observation being 7 days as nearly as possible 51s. ÷ 7 = 7s·28. the daily rate losing.

To find the Error for Mean Noon Greenwich.

	h.	m.	s.
Long. of Bombay, as above in time, E. - - - -	4	51	39
Error of Chronometer, May 25d. - - - -	4	56	50
Chronometer slow for M.T. Greenwich - - - -	0	5	11
Greenwich Date of last observation 25d. 15h. 38m. 21s. or 8h. 21m. 39s. before noon on 26th pro. part of daily rate for that interval -		+	2·5
Error of No. 279 for M. Noon Greenwich, May 26d. - -	0	5	13·5

† The same as dividing by 3 to have the mean, and 2 afterwards, to obtain the ⊙'s alt.

‡ Reject 12 hours to assimilate the time to the face of the watch.

EXAMPLE II.

1844. June 7d. 3h. 39m. M. T. at New York, in lat. 40° 42′ N. long. 74° 7′ West. The following altitudes of the Sun's upper limb were taken in the quicksilver, and the corresponding times by Chronometer, No. 375, to obtain its error. Ther. 72°.

	d.	h.	m.	s.
M. T. - -	7	3	39	0
Long. in time W.	+	4	56	28
Greenwich Date	7	8	35	00

Times by No. 375. h.	m.	s.	Alts. ⊙		
3	20	36	82°	43′	10″
	21	44	82	13	20
	22	51	81	44	00
Divide by 3 -		131		40	30
Means - 3	21	43·7	82	13	30

⊙'s alt. - - - -	41	6	45
⊙'s cor. - 59″		—	57
Ther. 72° - 2			
	41	5	48
⊙'s semid. - - -		15	46
⊙'s T. alt. - - -	40	50	2
P. D. - - - -	67	10	4
Lat. - - - -	40	42	0
Sum - - - -	148	42	6
Half Sum - - - -	74	21	3
Diff. - - - -	33	31	1
App. T. - - - -	3h.	39m.	58·6s
Eqn. T. - - - -	—	1	24·0
M. T. merid. of Obs. - -	3	38	34·6
Time shewn by Chron. - -	3	21	43·7
Chron. slow for M. T. at New York		16	50·9

	°	′	″
⊙'s decl. 7d. incg. -	22	47	58·8 N.
Diff. for 1h. 13″·69 × 8h. 35 = +	1	57·5	
Red. decl. - -	22	49	56
	90		
P. D. - - -	67	10	4

	m.	s.
Eqn. T. 7d. decg. - -	1	27·99
Diff. 1h. ·469 × 8h. 35m. = —		4·02
Red. Eqn. T. - - -	1	23·97

Log. - - -	·03544	
- - -	·12025	
- - -	4·43096	
- - -	4·74208	
- - =	9·32873	

On the 17th of June, at 3h. 50m. the same Time-keeper was found slow for mean time, at the same place, 17m. 39s. the Chronometer had therefore lost 48s·1 in 10 days; and 48s·1 ÷ 10 = 4s·81 the daily *rate* losing.

To find the Error at Greenwich for mean noon on the 17th June.

	h.	m.	s.
Longitude of New York 74° 7′ W. in time - - - =	4	56	28
Chronometer slow for mean time at New York at 3h. 50m. P.M. 17th, add	0	17	39
Chronometer slow for mean time at Greenwich at time of observation -	5	14	7·0
Proportion of daily rate for 8h. 46m. - - - - -	—		1·7
Chron. slow for mean noon at Greenwich 17th June, 1844 - -	5	14	5·3

Here we may call the error 5h. 14m. 5s. and the daily rate 4·8s. it being always sufficient for nautical practice to use the nearest second of the *error*, and nearest tenth of a second of the *rate* of a Chronometer. But in the work to find the *error* on different days, for the purpose of ascertaining the *rate;* the fractions of seconds of time ought not to be neglected.

Altitudes observed on different days, for the purpose of finding the rate of a Time-keeper, should always be taken on the same side of noon, and as near the same time of the day as possible. The interval between the observations ought not to be less than 4 days, nor greater than 12 or 14; for when the interval is only 1 or 2 days, a small error in either of the observations will materially affect the rate; and if the interval be too long, any irregularity in the going of the watch is not so likely to be detected.

When the *error* and *rate* of one Chronometer are found, it is very easy to ascertain the *errors* and *rates* of any number of watches, by comparing each at two separate times with the one whose error and rate are known. For example, Let the Chronometer, of which the error and rate are found in Example II. be called No. 1 : it is required to find the error and rate of a Chronometer, No. 2.

	h.	m.	s.
June 7.—Time by Chronometer, No. 1 - -	3	26	29
Time by Chronometer, No. 2 - -	2	39	—
No. 2 Slow of No. 1, at 3h. 26m. on 7 June	0	47	29

	h.	m.	s.
June 17 —Time by Chronometer, No. 1 - -	3	54	23
Time by Chronometer, No. 2 - -	3	48	
No. 2 Slow of No. 1, at 3h. 54m. 17 June	0	46	23

Here the interval being so nearly 10 days, may be taken as such; and as No. 2 has gained 1m. and 6s. on No. 1, during that time, it has therefore gained 6·6s. daily on No. 1: but the rate of No. 1 is 4·8s. losing, hence the rate of No. 2 is = 6·6s.—4·8s.=1·8s. gaining.

As the rate of No. 2 is small, it will be sufficient to apply the difference of the times shewn by the Chronometers on that day, to the Error of No. 1, for noon at Greenwich, on the 17th June. Now No. 1 is 5h. 14m. 7s. slow for mean time at Greenwich, when the observation is made on the 17th June, and No. 2 is 46m. 23s. slow of No. 1 at the same time; therefore No. 2 is 6h. 0m. 30s. slow for mean time at Greenwich on the 17th June, and its daily *rate* is 1·8s. gaining.

Or the errors of No. 2 for mean time at New York, when the observations were made on the 7th and 17th June, may be found by comparing it with No. 1, and by these errors the rate and error of No. 2 may be deduced in the same manner as those of No. 1. Thus, on the 7th June No. 1 is 16m. 51s. slow for mean time at New York,

and at the same time No. 2 is 47m. 29s. slow of No. 1; therefore No. 2 is 1h. 4m. 20s. slow for mean time at New York on the 7th June, and on the 17th June No. 1 is 17m. 39s. slow for mean time at New York; and at the same time No. 2 is 46m. 23s. slow of No. 1, therefore No. 2 is slow for mean time at New York 1h. 4m. 2s. on the 17th June. Hence the Chronometer, No. 2, has gained 18s. in 10 days, which gives the daily *rate* 1·8s. gaining, as before; and by adding the 1h. 4m. 2s. the error of the watch on the 17th, to 4h. 56m. 28s., the longitude of New York in time, the sum 6h. 0m. 30s. is the error of No. 2 for mean noon at Greenwich.

When the Rates and Errors of several watches are to be deduced from the same observations, they should each be compared with the one of which the time is noted, as near to the time of observation as possible, that the rates, &c. of the other watches may not be affected by any irregularity in the going of that one by which the time is taken.

SECOND METHOD.

To find the Error and Rate of a Chronometer by altitudes of a fixed Star, taken by means of an artificial horizon.

RULE.

1. Choose a Star, of which the declination is of the same name as the latitude of the place of observation, find, in Table IX. the altitude by which the horary angle may be found with the greatest accuracy, and let the altitude of the Star be observed when the angle on the instrument is as near to twice the altitude found in Table IX. as possible; then take a set of altitudes of the Star, with the corresponding times, by the Chronometer, in the same manner as in the last method.

2. To the mean double altitude, apply the index error of the Sextant, which will give *twice* the apparent altitude; from the apparent altitude subtract the correction of the Star in altitude, Table VI. the remainder will be the *true* altitude of the Star.

3. Proceed by Problem II., and find the mean time; the difference between this and the mean of the times of observation by the Chronometer, will be its error for mean time, and by finding the *error* at some subsequent time, the rate is deduced as before.

EXAMPLE.

1844. Jan. 6d. 8h. M. T., in lat. 56° 84′ N., long. 2° 35′ W., the following alts. of the * Castor were observed East of meridian, in an artificial horizon, with the corresponding times by Chronometer, to find its error for M. T., error of Sextant + 40″.

Times by Chro. h. m. s.	Dble alts. * ° ′ ″
8 7 15	79 50 10
8 58	80 23 30
10 46	80 57 20
Divide by 3 — 26 59	241 11 00
Means — 8 8 59·7	80 23 40
M. T. obs. 8 4 21·4	Index error + 40
Chro. fast for M.T. 4 38·3	80 24 20
	½ — 40 12 10
	* cor. — 1 7
	* T. alt. 40 11 3
	* P. D. 57 46 33
	Lat. — 56 34 00
	Sum — 154 31 36
	Half Sum 77 15 48
	Diff. — 37 4 45

	d. h. m. s.
M. T. at place of obs.	6 8 0 0
Long. in time W. —	+ 10 20
Gwh. D. — —	6 8 10 20
S. T. M. N. — —	19 0 42·49
Accel. for Lon. W. —	+ 1·69
Red. S. T. M. N. —	19 0 44·18
	24 0 0·0
Comp. to 24h. —	4 59 15·82
* Decl. red. —	32° 13′ 27″ N.
	90
	57 46 33

	h. m. s.		
Log.			·07265
—			·25887
—			4·34335
—			4·78026
* H. ∠ west — — —	19 41 46·70	=	9·45513
Comp. S. T. M. N. — —	4 59 15·82		
* Red. R. A. — — —	7 24 38·46		
	32 5 40·98		
Less — — — — —	24 0		
Sid. hrs. &c. — — —	8 5 40·98		
Retardation — — — —	— 1 19·57		
M. T. of obs. — — —	8 4 21·41		

On the 13th of the same month, at 7h. 40m. P. M. civil time, the error of the Chronometer was again found by *Castor*, and was then 5m. 21s. fast for mean time. Hence the gain in 6 days 23h. 42m. is 42s·7; but the interval being so near 7 days, may be so esteemed, and 42s·7 ÷ 7 = 6s·1 the daily rate, gaining.

To find the Error for Mean Noon at Greenwich on the 13*th Jan.*

	h. m. s.
Longitude of the place of observation 2° 35′ W. in time — —	0 10 20
Chron. fast for mean time at the place of obsn. at 7h. 40m. P.M. 13th	0 5 21
Chronometer slow for mean time at Greenwich, at time of observation	0 4 59
Proportion of daily rate for time past noon at Greenwich, viz. 7h. 50m.	+ 2
Chronometer slow for mean noon at Greenwich, 13th January, 1844	0 5 1

Equal altitudes of a fixed Star, observed at an interval of a few days, may be employed to find the *rate* of a Chronometer. This is a very easy method of finding the rate of a watch, and may be used with advantage in any part of the habitable globe, when the stars can be seen; but in high Latitudes, when the Sun's declination is of a different name, from the Latitude, this is the best method for merely finding the *rate* that can be employed by a person who is, only, provided with a Sextant and an artificial horizon.

RULE 1. Choose a Star, of which the altitude is greater than 10°, and less than 60°, when it is at or near the prime vertical; and when the Star is in this position, on any evening, observe its altitude, and note the corresponding time by the Chronometer.

2. In an interval of from 3 to 14 days, again observe the same Star, when its altitude is equal to that first observed, and note the time by the Chronometer

3. Take the time from Table A*, page 52, for the number of days between the observations; subtract this time from the time shewn by the Chronometer, when the first altitude was observed, the *remainder* will be the time that the Chronometer would shew when the second altitude is observed, if it were to keep mean time exactly. Now it is plain, that if the time shewn by the Chronometer at the instant, the second observation is made, be *greater* than the *remainder*, the watch is gaining; but if the time by the watch of the second observation be *less* than the *remainder*, the watch is losing; the difference, in either case, being divided by the number of days in the interval, will shew the daily rate.

EXAMPLE.

December 1, 1844, in Latitude 51° 30′ N. the altitude of Aldebaran, observed in an artificial horizon, was 41° 5′ 20″, and the time shewn by a Chronometer at the instant the altitude was observed was 6h. 56m. 44s.; on the 10th of December, when Aldebaran had the same altitude, the time by the Chronometer was 6h. 21m. 3s.: required the *rate* of the Chronometer?

	h.	m.	s.
Time on 1st Dec. when the Star's altitude was 41° 5′ 20″	6	56	44·0
Time from Table A* for interval of 9 days	—	35	23·2
Remainder, or time the Chr. ought to shew 10th Dec. when Star's altitude is 41° 5′ 20″	6	21	20·8
Time shewn by Chr. on the 10th Dec. when the Star's alt was 41° 5′ 20″	6	21	3·0
Loss of the Chronometer in 9 days (divide by 9)			17·8
Daily rate of the Chronometer, losing			1·98

REMARK.

By setting the Sextant to the degree, or degree and a half on each side the prime vertical, a set of observations may be obtained. The correctness of the result, in all cases, will depend upon the exactness with which the index is set at the time of the second observation, and so on, and upon its error continuing the same at each date of observation.

THIRD METHOD.

To find the Errors and Rate of a Chronometer by means of the Lunar Distances.

RULE.

1. When there is a good opportunity for observing the distance between the Sun and Moon, or between the Moon, and a Planet, or a Star, observe several sets of distances with the Altitudes of the objects, and note the times by the Chronometer when the observations are made.

2. Deduce the apparent distance and apparent altitudes of each set, and from these find, by Problems III. and IV., the mean time at Greenwich answering to each set of distances; the difference between the *mean time* at Greenwich, as found by any particular set, and the time shewn by the Chronometer when that set is observed, will shew the *Error* of the watch, for mean time at Greenwich; find the Error for each set, and take their mean as the *Error* for *mean time* at Greenwich, for the hour, nearest to the mean of the times of observation.

3. At an interval of at least 8 or 10 days, again find the Error of the Chronometer; then having the *Errors* at two given times, find the Rate, as in the foregoing methods; and also the Error for the noon at Greenwich, nearest to the last found Error.

EXAMPLE.

1844. September 3d. 21h. 12m. 20s. M. T. ship in lon. 22° 7′ W., the following observations were taken to obtain the error of Chronometer S. eye at 16f., time shewn by Chronometer 10h. 33m. 17s.

	d.	h.	m.	s.									
M. T. Ship	3	21	12	20	Alt. ☉		48° 16′	☽'s semid.	14′ 46″	☽'s obs. alt.	31° 18		
Lon. in time W.	+ 1	28	28		Semid. + 15·53 Dip. — 3·53	+ 12		Aug.	7				
Gwh. D.	3	22	40	48	☉'s App. alt.	48	28	Red. semid. 14 53 Dip — 3 53			+ 11		
								☽'s app. alt.			31 29		
	☽ — ☉ E.				☽'s Hor. Px.	54′ 12″		Log.	·0613	— ·0613			
Obs. dist.	95°	9′	33″		☉'s app. alt.	48° 28	0	Log.	·5858				
Sum of Semids.	+ 30	46			☽'s app. alt.	31 29	0		·7421				
App. dist.	95	40	19					Log. S. ·9979	T. 2·0030				
1st corr.	4	19	14					1·6450					
2d corr.	4	57	12						2·8064				
3d. corr. 2′ 15″ ☉'s Px. — 5		2	10										
												h.	m. s.
T. dist. (less 10°)	94	58	55		Pro log. of diff.	45′ 37″			·5961	Time from N. A.		21	0 0
Dist. from N. A. at 3d. 21h.	95	44	32		Pro log. from N. A.				·3456				
Diff.	0	45	37		Pro log. of interval				·2505	=		1	41 6
					M. T. at Greenwich							22	41 6
					Time by Chronometer S.	+ 12h.						22	33 17
					Chronometer slow for Gwh. M. T.								7 49

By five other sets of sights taken after this, the following errors were obtained:

	Chro. S.			Lunars.			Errors.	
	h.	m.	s.	h.	m.	s.	m.	s.
Set 1 (above)	22	33	17	22	41	6	7	49
„ 2		36	21		44	8	7	47
„ 3		39	1		46	54	7	53
„ 4		42	40		50	25	7	45
„ 5		47	17		55	2	7	45
„ 6		49	32		57	22	7	50
Divide by 6					294	57	289	
Gwh. M. T.	3	22	42	9	Chro. slow		7	48 for M. T. Gwh.

EXAMPLE.

1844. September 19d. 5h. 33m. Greenwich M.T., the following apparent altitudes and distances were deduced from observations to find the error and rate of Chronometer S. The Moon being nearly at the same distance on the opposite side of the Sun, as when the former sights were taken to obtain the error of S. Time shewn by Chronometer S. 5h. 24m. 36s.

	° ′ ″			
☽'s red. hor. px.	58 57	Log.	·0248	·0248
⊙'s app. alt.	38 53		·6622	
☽'s app. alt.	26 59			·8032
App. dist.	95 53 15		S. ·9977	T. ·9867
1st corr.	4 22 48		1·6847	
2nd corr.	4 57 15			1·8147
3rd corr. 2′ 13″ ⊙'s Px. — 4	2 9			
T. Dist. (less 10°)	95 15 27	pro log. of diff.	1° 23′ 8″	·3355
Dist. from N.A. 19d. 3h.	93 52 19	pro log. from N. A.		·2664
Diff.	1 23 8	pro log. of approx. interval		·0691

	Time from N. A.
19d. 3h. 0m. 0s.	
	2 33 31
	5 33 31
Diff. of pro logs. in N. A. 7 incg. correction for approx. interval	— 1
M. T. Gwh.	5 33 30
Time by Chronometer S.	5 24 36
Chronometer slow for M. T. Gwh.	8 54

Five more sets were observed and the following results obtained:—

	Chro. S. h. m. s.	Lunar. h. m. s.	Errors. m. s.
Set 1 (above)	5 24 26	5 33 30	8 54
„ 2	28 7	37 4	8 57
„ 3	30 39	40 0	9 21
„ 4	32 48	41 53	9 5
„ 5	34 42	43 39	8 57
„ 6	36 38	45 44	9 6
Divide by 6		241 50	54 20

Gwh. M. T.	19 5 40 18	error of S.	9 3½ slow for G. M. T.
Gwh. M. T. of former observations	3 22 49 9	error of S.	7 48 slow „
Interval between observations	15 6 51 9	Chro.	1 15 has lost.

The interval may be called 15d. 7h. = 367 hours, the 75s. lost by Chronometer S., divided by the hours of the interval, give ·2043 per hour × 24h. = 4s·9 for daily rate, *losing*. The Greenwich time of last found error is 5h. 40m. past noon of 19d. therefore ·2043 × 5h⅔ = 1s. 16 which deducted from 9m. 3s·3 the last found error leaves 9m. 2s. error of Chronometer S., slow for Greenwich M. Noon, Sept. 19th, and the daily rate losing 4s·9.

It is not necessary that all the observations for finding the errors, at the beginning or end of the interval, should be made on the same day, nor that the Moon's distances should be all taken from the same object. When the observations, at the beginning or end of the interval, are made on different days, set down all the times at Greenwich with their respective errors opposite to them, find the sum of the *times*, and also that of the *errors;* these sums being divided by the number of times, or errors, will give the required epoch and the corresponding error of the Chronometer. For example, let the times at Greenwich, and corresponding errors of a Chronometer for mean time at that place, be as follows:

1844. No.	Mean time at Greenwich. d. h. m.	Errors of Chronometer *slow* for mean time at Greenwich. h. m. s.	
1.	March .. 5 4 30	2 6 28	By ☽ and ☉
2.	ditto .. 6 5 0	2 7 11	☽ and ☉
3.	ditto .. 6 9 30	2 6 53	☽ and Jupiter.
4.	ditto .. 7 4 0	2 7 18	☽ and ☉
5.	ditto .. 7 10 0	2 6 20	☽ and Pollux.
Sums (divide by 5)	32 9 0	34 10	
Means	6 11 24	2 6 50	

Here the mean of the times at Greenwich is March 6, at 11h. 24m. and the mean error, or that which answers to the mean Greenwich time is 2h. 6m. 50s.; and by again finding the error of the watch for some subsequent time, the rate may be deduced as before.

The same degree of accuracy is not to be expected in this method of settling the *rate* of a time-keeper, as may be obtained by altitudes of the Sun or Stars taken on shore; it is, however, as has been before observed, the only method that can be employed at sea, and the Navigator, who carefully practises it, will seldom find 5 miles of error in the longitude, as given by a tolerably good Chronometer, during a passage of any length, for in this case we do not depend upon the exact going of the Chronometer, for a long period, but merely from one set of lunar observations to another.

Sometimes lunar observations and the bearings of some well-known point of land may be combined, to obtain the error and rate of a Chronometer, and should be had recourse to when no other means offer.

EXAMPLE.

1844. July 20d. 1h. 30m. M. T. Lat. 24° 29′ S., lon. 60° E. The following app. alts. of ⊙ and ☾, and app. dist. of ⊙ west of ☾, were deduced from observations to obtain the error of Chronometer, No. 858. The Greenwich Date employed to correct the elements from the N. A. was 19d. 21h. 30m. Time shewn by No. 858 at moment of observation 9h. 29m. 45s., elevation 15 ft.

					°	′	″						
Cor. hor. px.	-	-	-			57	49	Log.	-	·0332	-	·0332	
⊙'s app. alt.	-	-	-		40	30	00	-	-	·6475			
☽'s app. alt.	-	-	-		51	1	00	-	-	-	-	·5694	
App. Dist.	-	-	-		58	25	43	Log. S.		·9305	Log. T.	1·2114	
1st. corr.	-	-	-	-	4	15	56	-	-	1·6112			
2nd corr.	-	-	-	-	5	27	37	-	-	-	-	1·8140	
3rd corr. 1′ 12″ ⊙'s px. — 4				-		1	8						
True Dist. (less 10°)	-	-			58	10	24	pro log. of 16′ 38″			-	-	1·0343
Dist. from N. A.	-	-	-		57	53	46	at 19d. 21h. 0m. 0s. and pro log.					·2818
						16	38		0	31	49	approx. interval	·7525

Corr. for diff. of pro log. N. A., 9 decg. - + 2

	h.	m.	s.
M. T. Gwh. - - - - - 19d.21h.31m.51s., or	9	31	51
Time by No. 858 - - - - - - - - -	9	29	45
Chro. slow for Gwh. M. T. - - - - - - - -		2	6

By two more sets of sights of the ⊙ and ☾, and 3 sets of ☾ and * Antares east of ☽, the following results were obtained. Set 1 is the above.

	Time by No. 858.					Lunar.					Diff.		
	d.	h.	m.	s.		d.	h.	m.	s.		h.	m.	s.
Set 1 -	19	21	29	45	-	19	21	31	51	-	0	2	6
„ 2 -		21	34	40	-		21	36	44	-	0	2	4
„ 3 -		21	37	59	-		21	40	09	-	0	2	10
„ 4 -	20	2	20	06	-	20	2	22	18	-	0	2	12
„ 5 -		2	24	16	-		2	26	35	-	0	2	19
„ 6 -		2	31	27	-		2	33	39	-	0	2	12
Divide by 6 - - - - -						120	0	11	16			63	
Gwh. Date - - - - -						20	0	1	53	Error of No. 858	2	10·5	slow for M. T. Gwh.

EXAMPLE.

To find the Error of Chronometer by the bearing of the Land, &c.

1844. August 10d. at App. Noon. The Quoin Pt. bore E. N. E. by compass, the variation of which was ascertained to be 2¼ points westerly. The obs. lat. was 35° 9′ S. True bearing N. E. ¼ N.

Lat. obsd. -	35° 9′ S.			
Lat. Quoin Pt. -	34 49			
x of lat. - -	20 and course 3¼ pts. give 16·5 dep. = to *x* of long.		0°	20′
Long. of Quoin pt. - - - - - - - - - - - -			19	37 E.
Long. of Ship - -	in time 1h. 17m. 8s. - - -	=	19	17
By the morning sights 19′½ East of the merid. of observation at Noon the M. T. at Ship, was (less 12h.) - - - - - - - - - -			8h.	49m. 57s.
The merid. 19′½ to the West of the A. M. Observations would have the time earlier by the amount of that *x* long. viz. - - - -		—	1	18
M. T. at Meridian of Noon observation - - - - - -		8	48	39
Chronometer No. 858 shewed at same time - - - - -		7	27	1
Error of No. 858 for Noon merid. Slow - - - - -		1	21	38
Long. in time, E. - - - - - - - - - - -		1	17	8
Error for Greenwich M. T. Aug. 9d. 19h. &c. Slow - - - -			4	30
Error for Greenwich M. T. July 20d. Slow - - - - -			2	10·5
Loss since July 20d. - - - - - - - - - - -			2	19·5
			×	60
				139·5
The interval between the dates of the two errors is 20d. 19h. 30m. equal to half hours (by which divide the loss) 139·5 = ·14			-	999·

·14 × 48 the half-hours in a day give 6·72s. as the daily rate, which is losing, as both errors are slow, and the last is the greater.

To find the Error for Mean Noon at Greenwich on the 10th August, being the nearest noon.

M. T. of last found error + 12h. - - - - - -	9d.	20h.	48m.	39s.
Long. in time E. - - - - - - - - - -		1	17	8
M. T. at Greenwich - - - - - - - - -	9	19	31	31
	10	0	0	0
Before Noon of the 10th - - - - - - - - -		4	28	29
Pro. part of daily rate 6s·72 for 4h. 29m. = - - - - - -	-	+		1·25
Last found error - - - - - - - - - - -		4	30·	0
	-			
Error for Greenwich M. Noon, Aug. 10d. Slow - - - - -		4	31·25	

On the Management of Chronometers.

Unless particular care be taken of Chronometers, it is not to be expected that such delicate pieces of mechanism can continue to go with regularity; it may, therefore, be of service to those who have not had much experience in the use of time-keepers to attend to the *following remarks:*

1. A Chronometer should be wound up at regular intervals, it being very improper to let one that is generally wound up between 8 and 9 o'clock in the morning run till noon. Great care should be taken to avoid circular motion; therefore, when winding up a Chronometer, it must be kept steady, and the key only turned. The number of turns of the key should be counted, that the last few may be wound gently so as not to butt too sharply.

2. Chronometers should be placed so as to be as little exposed as possible to sudden shocks, from the sea striking the ship, or from the shutting of doors, &c.: they ought not to be exposed to a current of air; and nothing *magnetic* should be allowed to remain near them. They should be placed as near the centre of motion as possible. A small table, secured to the deck (not to a bulkshead), with a stancheon on each side, to prevent people from rolling against it, will be found convenient: the table may have a well in it, capable of holding the requisite number of watches, with a sufficiency of dry sawdust or cotton around them, to break the force of unavoidable concussions upon deck or elsewhere, or a box upon the table may be used instead of a well in it. Watches should always be kept in the same position that they are placed in when first they come on board. As soon as they are placed they should be compared.

3. It is very improper to make a practice of taking a Chronometer on deck, when observing altitudes, merely to find the longitude; for, besides the risk of accidents, it is hardly possible to carry about a Chronometer without giving it too much circular motion. Any sudden change of temperature ought also to be avoided: it is therefore proper to take the times of observing the altitudes by a common watch, and find the difference between it and the Chronometer, immediately before or after the observation: then this difference being applied to the mean of the times of observation by the watch, will show the time by the Chronometer answering to the mean altitude.

4. If a Chronometer be allowed to run down, it will not commence going again, after being wound up, until it gets one or two pretty quick quarter turns in a horizontal direction, its face being upwards. After being set going, a Chronometer will sometimes keep the same *rate* it had before it was let down; this, however, is uncertain, and no dependance can be placed on it, until a fresh *rate* and *error* be obtained.

5. When a Chronometer is carried to or from the Ship, it should be fastened by means of the studs and screws, to prevent it from

traversing on its gimbles. Great care should be taken by a person carrying a Chronometer, that it gets no sudden jerks, or quick circular motion. If the rate of a Chronometer can be properly ascertained, when it is on board, it ought not to be taken on shore for that purpose. Commander Richard Owen, in his "Essay on Chronometers," says that "it may be taken for an absolute maxim in general practice, that the rate of a Chronometer obtained on shore will not be the rate that it will keep when it is removed to a vessel."

6. Change of temperature generally produces the greatest alteration in the rate of a watch. In a paper by Mr. Fisher, published in the "Philosophical Transactions," for 1820, page 196, it is stated that "Chronometers generally go faster on board of a Ship than on shore." Mr. Fisher ascribes this to the magnetic effect of the iron in the Ship on the steel part of the balance of a Chronometer. This is a subject that deserves farther attention from all intelligent Navigators.

7. The conclusion to be drawn from the foregoing remarks is this: As soon as a Chronometer is in the Navigator's hands, every opportunity should be employed to ascertain its error and rate. The Time Balls at our large sea-ports were established for this object. Headlands and lights, when in soundings, and lunars, on the ocean, must all be resorted to. In addition to these, the prudent Navigator will not neglect to put into practice the good old maxim, "Latitude, look out, and LEAD."

Table A* is given for the method of finding the rate of a Chronometer, by equal altitudes of a Fixed Star, observed on different days. It will also answer for the method by transits of the Fixed Stars. If the acceleration be wanted for any time exceeding 60 days, it may be found by adding together the accelerations answering to the days in the Table that make up the given time.

TABLE A*, Acceleration of the Fixed Stars, in Mean Time.

Sidereal Days.	Acceleration.	Sidereal Days.	Acceleration.	Sidereal Days.	Acceleration.	Sidereal Days.	Acceleration.
	h. m. s.		h. m. s.		h. m. s.		h. m. s.
1	0 3 55·9	16	1 2 54·5	31	2 1 53·1	46	3 0 51·8
2	0 7 51·8	17	1 6 50·4	32	2 5 49·1	47	3 4 47·7
3	0 11 47·7	18	1 10 46·3	33	2 9 45·0	48	3 8 43.6
4	0 15 43·6	19	1 14 42·3	34	2 13 40·9	49	3 12 39·5
5	0 19 39·5	20	1 18 38·2	35	2 17 36·8	50	3 16 35·4
6	0 23 35·4	21	1 22 34·1	36	2 21 32·7	51	3 20 31·3
7	0 27 31·4	22	1 26 30·0	37	2 25 28·6	52	3 24 27·2
8	0 31 27·3	23	1 30 25·9	38	2 29 24·5	53	3 28 23·1
9	0 35 23·2	24	1 34 21·8	39	2 33 20·4	54	3 32 19·0
10	0 39 19·1	25	1 38 17·7	40	2 37 16·3	55	3 36 14·9
11	0 43 15·0	26	1 42 13·6	41	2 41 12·2	56	3 40 10·8
12	0 47 10·9	27	1 46 9·5	42	2 45 8·1	57	3 44 6·8
13	0 51 6·8	28	1 50 5·4	43	2 49 4·0	58	3 48 2·7
14	0 55 2·7	29	1 54 1·3	44	2 53 0·0	59	3 51 58·6
15	0 58 58·6	30	1 57 57·2	45	2 56 55·9	60	3 55 54·5

DIRECTIONS

FOR ACQUIRING A KNOWLEDGE

OF THE

PRINCIPAL FIXED STARS.

INTRODUCTORY REMARKS.

1.—The fixed Stars are so called from their appearing to retain the same positions with respect to each other. Some of the Stars have indeed been observed to change their relative places; but this change, which is called the *Proper Motion* of the Stars, is very slow, and could not be perceived, without instruments, in a period of more than a thousand years.

2.—The distance of the fixed Stars from the Earth is so great, that no method has yet been found by which the distance of any of them can be ascertained; but it is known that the nearest fixed Star is at least 80,000 times more distant than the Sun, whose distance from the Earth is about ninety-five millions of miles.† Now as the Sun's parallax, that is the angle which the semidiameter of the Earth would appear under to an eye in the Sun, is hardly 9″, it is plain that the parallax of the fixed Stars must be quite insensible. The immense distance of the Stars is no doubt also the cause of their appearing to have no sensible magnitude, when viewed by means of Telescopes of the best construction.

3.—There can be little doubt of the fixed Stars being bodies of the same nature as the Sun, and that each Star has a system of Planets which derive light and heat from it; for it is not reasonable to suppose that bodies of such magnitude as the fixed Stars must be, were created merely to give a faint light to the inhabitants of this Earth, and the other Planets belonging to the solar system. Indeed the Stars visible to the naked eye are not a thousandth part of what may be seen through a good Telescope, the far greater part of which cannot be said to give light, or to be in any way useful to mankind.

† See Brinkley's Elements of Astronomy, page 127, second edition.

4.—The Stars that appear brightest to us are called Stars of the first magnitude; the next in brightness, Stars of the second magnitude, and so on, till those that can just be seen with the naked eye, which are called Stars of the sixth magnitude; and the Stars that can only be seen with the assistance of a Telescope, are called Telescopic Stars. Those parts of the heavens that have the appearance of whitish clouds to the eye, are found to be collections of Telescopic Stars: these clusters are called *Nebulæ*. The *Milky Way* is the most conspicuous and extensive Nebula, and the next is the *Magellanic Clouds*. The latter can only be seen in southern latitudes, or in places a few degrees North of the equator.

5.—The number of Stars visible to the naked eye, is far from being so great, as is generally imagined by those who have not paid attention to this subject. It is very seldom that more than *one thousand Stars* can be seen at a time. The number of Stars of the first magnitude is only about twenty, and the Stars of the second magnitude amount only to about fifty, in all parts of the heavens. It is therefore far from being difficult to obtain a knowledge of the principal Stars.

6.—Some Stars disappear at times, and after remaining invisible during a certain interval, again make their appearance, in the same place as before: these are called *Periodical Stars*. Others are observed to be brighter at certain times than they are at other times, but never disappear altogether: these are termed *Variable Stars*. It is very probable that the phenomena of the periodical and variable Stars arise from the motion of the Stars on their axis, and from some of them shewing more light from one side than from the other.

7.—Several of the Stars that appear single to the naked eye, are found, when viewed through a telescope, to consist of two and some of three or four Stars: these are called double, treble, &c. Stars. It is probable that the Stars forming these are at great distances from each other, and that the reason of their appearing to us to be so near each other, is from the Stars being nearly in the same line when seen from the Earth.

8.—It has been found convenient to divide the Stars into groups called CONSTELLATIONS; to each of which is given the name of some celebrated man, or of some animal or other terrestrial object. Many of the principal Stars have also particular names, but as it would only create confusion to have a name, even, for every Star visible to the naked eye, astronomers distinguish the Stars as follows: the first letter of the Greek alphabet being attached to the name of any Constellation points out the brightest Star in that Constellation; the second letter the next in brightness, and so on. When the number of Stars in a Constellation exceeds the number of letters in the Greek alphabet, the letters of the Italic alphabet are next used, then those of the Roman alphabet, if required: and when the number of Stars is greater than the number of letters in these three alphabets,

the remaining Stars are distinguished by means of the common numericals.

9.—An imaginary circle in the heavens, or *Celestial Sphere*, coinciding with the *Equator*, is called the EQUINOCTIAL, and that which coincides with the *orbit* or *path* in which the Earth moves in its revolution round the Sun, is called the ECLIPTIC. The equinoctial and ecliptic cross or cut each other in opposite points, making angles of about $23\frac{1}{2}°$ at those points, and their distance from each other when greatest, that is at 90° from the points where the circles cross each other is equal to the angle at either of the points, or $23\frac{1}{2}°$.

10.—The *Poles* of the equinoctial are two opposite points in the Celestial Sphere, 90° distant from every part of the Equinoctial Circle; and the *Poles* of the ecliptic are two points in the Celestial Sphere, 90° distant from every part of the ecliptic. Hence the poles of the equinoctial and ecliptic are $23\frac{1}{2}°$ distant from each other.

11.—The distance of a Star from the equinoctial is called its DECLINATION, and the LATITUDE of a Star is its distance from the ecliptic. The LONGITUDES and RIGHT ASCENSIONS of the Stars are reckoned eastward from the vernal equinox, that is, from the point where the Sun's centre crosses the equinoctial about the 20th of March, the right ascension being measured by an arc of the equinoctial, contained between the vernal equinox, and the point where a great circle passing through the pole of the equinoctial and the given Star, cuts the equinoctial; and the longitude, by an arc of the ecliptic, contained between the vernal equinox, and the point where a great circle passing through the pole of the ecliptic and the Star, cuts the ecliptic; therefore, the longitude or right ascension of a Star may be any arc less than 360°, but neither the declination nor latitude of a Star, can exceed 90°. The right ascension of any object is generally given in time, at the rate of one hour to fifteen degrees, this being most convenient for general purposes. The practical navigator requires only to know the right ascension and declination of a Star, for the purpose of deducing the latitude, or time, from its altitude.

12.—The ZODIAC is an imaginary zone or belt in the heavens, extending 8° on each side of the ecliptic, quite round the Celestial Sphere, and contains the orbits or ecliptics of the planets.† There are twelve Constellations in the Zodiac, which have the same names as the twelve spaces, called the signs of the Zodiac, each of which occupies 30° along the ecliptic. Formerly the Constellations were actually contained in these spaces or signs; but at present, each Constellation is nearly one sign more to the eastward, with respect to the signs of the Zodiac, that is, the first Constellation, is now in the second sign, and so on. This is occasioned by a slow change in the direction of the

† The orbits of some of the lately discovered planets are not contained within the Zodiac. These planets are very small, and can only be seen by means of a good Telescope.

Earth's axis, with respect to the fixed Stars, which causes the *Plane* of the equinoctial to change its position, whilst that of the ecliptic remains fixed, or very nearly so. Hence arise the *Precession* of the equinoxes, and the *Variations* in the longitudes, right ascensions, and declinations of the fixed Stars.

The number of Constellations in the heavens, is about one hundred. The following list is mostly copied from *Mackay's* work on the Longitude:—

Constellations and Signs in the Zodiac.

Latin Names.	English Names.	Characters.	Latin Names.	English Names.	Characters.
1 Aries	The Ram	♈	7 Libra	The Balance	♎
2 Taurus	The Bull	♉	8 Scorpio	The Scorpion	♏
3 Gemini	The Twins	♊	9 Sagittarius	The Archer	♐
4 Cancer	The Crab	♋	10 Capricornus	The Goat	♑
5 Leo	The Lion	♌	11 Aquarius	The Water Bearer	♒
6 Virgo	The Virgin	♍	12 Pisces	The Fishes	♓

Constellations in the Northern Hemisphere.

Latin Names.	*English Names.*	*Latin Names.*	*English Names.*
1 Ursa Minor,	The Little Bear.	21 Andromeda.	
2 Ursa Major,	The Great Bear.	22 Triangulum Borealis,	Northern Triangle.
3 Draco,	The Dragon.	23 Coma Berenices,	Berenice's Hair.
4 Cepheus.		24 Camelopardalis,	The Camelopard.
5 Bootes.		25 Monoceros,	The Unicorn.
6 Corona Borealis,	The Northern Crown.	26 Triangulum Minus,	The Little Triangle.
7 Hercules.		27 Lynx,	The Lynx.
8 Lyra,	The Harp.	28 Leo Minor,	The Little Lion.
9 Cygnus,	The Swan.	29 Asterion et Chara,	The Greyhounds.
10 Cassiopeia.		30 Cerberus.	
11 Perseus.		31 Vulpecula et Anser,	The Fox and Goose.
12 Auriga,	The Waggoner.	32 Scutum Sobieski,	Sobieski's Shield.
13 Serpentarius.		33 Lacerta,	The Lizard.
14 Serpens,	The Serpent.	34 Mons Mænalus,	Mountain of Arcadia.
15 Sagitta,	The Arrow.	35 Cor Caroli,	Charles' Heart.
16 Aquila,	The Eagle.	36 Renne,	The Rein Deer.
17 Antinous.		37 Taurus Regalis,	The Royal Bull.
18 Delphinus,	The Dolphin.	38 Friedriches Ehre,	Frederick's Glory.
19 Equleus,	The Horse Head.	39 Tubus Herschelii Major,	Herschel's Great Telescope.
20 Pegasus,	The Flying Horse.		

Constellations in the Southern Hemisphere.

Latin Names.	*English Names.*	*Latin Names.*	*English Names.*
1 Cetus,	The Whale.	25 Chamelion,	The Chameleon.
2 Orion.		26 Triangulum Australis,	Southern Triangle.
3 Eridanus,	The River Eridanus.	27 Pisces Volans,	The Flying Fish.
4 Lepus,	The Hare.	28 Dorado,	The Sword Fish.
5 Canis Major,	The Great Dog.	29 Toucan,	The American Goose.
6 Canis Minor,	The Little Dog.	30 Hydrus,	The Water Snake.
7 Argo Navis,	The Ship Argo.	31 Sextans,	The Sextant.
8 Hydra,	The Hydra.	32 Apparatus Sculptoris.	
9 Crater,	The Cup.	33 Fornax Chimiæ,	Chemical Furnace.
10 Corvus,	The Crow.	34 Horologium,	The Clock.
11 Centaurus,	The Centaur.	35 Reticulus.	
12 Lupus,	The Wolf.	36 Cælum Sculptorium,	The Graving Tool.
13 Ara,	The Altar.	37 Equuleus Pictoris,	The Painter's Easel.
14 Corona Australis,	Southern Crown.	38 Pyxis Nautica,	Mariner's Compass.
15 Pisces Australis,	Southern Fish.	39 Antlia Pneumatica,	The Air Pump.
16 Columba Noachi,	Noah's Dove.	40 Octans,	Hadley's Quadrant.
17 Robur Carolinum,	The Royal Oak.	41 Circinus,	Pair of Compasses.
18 Grus,	The Crane.	42 Norma,	Square and Rule.
19 Phœnix,	The Phœnix.	43 Telescopium,	The Telescope.
20 Indus,	The Indian.	44 Microscopium,	The Microscope.
21 Pavo,	The Peacock.	45 Mons Mensæ,	Table Mountain.
22 Avis Indica,	Bird of Paradise.	46 Solitaire,	The Indian Bird.
23 Musca,	The Fly.	47 Psalterium Georgianum,	Georgian Psaltery.
24 Crux,	The Cross.	48 Tubus Herschelii Minor,	Herschel's Small Telescope.

Several of these Constellations, as is evident from their names, have been formed of late years, partly from the Stars lying between the ancient Constellations, and partly from some of the more remote Stars, which formerly belonged to the old Constellations. In general the new Constellations are smaller, and contain fewer Stars than the old ones. The numbers prefixed to the Zodiacal Constellations shew the order in which they, as well as the signs of the Zodiac are placed. The numbers of the other Constellations are prefixed merely for the sake of reference.

It has been before remarked, that the Stars in the respective Constellations are represented by the letters in the Greek alphabet; the brightest Star being represented by the first letter, and so on. It may therefore be useful to give some of the first letters of that alphabet, with their names or sounds in English.

	Letters.	Names.		Letters.	Names.
1	α	Alpha.	6	ζ or ς	Zeta.
2	β	Beta.	7	η	Eta.
3	γ	Gamma.	8	ϑ or θ	Theta.
4	δ	Delta.	9	ι	Iota.
5	ε	Epsilon.	10	κ	Kappa.

These letters will be sufficient to distinguish the principal fixed Stars. In the following directions, the letter for any Star is merely attached to the name of the Constellation. Thus, *Aldebaran* is marked *α Taurus*, and *Pollux*, *β Gemini*. It may, however, be observed, that the proper designation of these Stars is *α Tauri* and *β Geminorum*; the meaning being *α* in Taurus, *β* in Gemini, and the same may be understood of the others.

The distances between the Stars which are given in the following directions are to the nearest half-degree, and may be readily measured with a Quadrant or Sextant.†

The bearing is the azimuth circle which a Star is in, when the Star from which the bearing is given is in the zenith: from this bearing, the direction between the two Stars is easily estimated at any other time. The Stars are distinguished in the usual astronomical method; that is, by giving the name of the Constellation in which a Star is situated, with the Greek letter which marks the given Star prefixed, and when the Star has a *proper name*, such as Aldebaran, Castor, &c., it is also given. The names of the Stars used in the Nautical Almanac for finding the longitude by lunar observations, are printed in small capitals, the names of the others in italics. The number included in a parenthesis after the name of a Star, refers to the *magnitude* of the Star. Thus *Sirius* (1) signifies that *Sirius* is of the first *magnitude*; and *α Aquilæ* or *Altair* (1, 2) means that this Star is between the first and second *magnitudes*.

As the *Pleiades* or *Seven Stars* are almost universally known, and can be seen in all parts of the habitable globe, we shall commence at this point, and first give directions for knowing the principal Stars in and near the zodiac, next for the Stars in the Northern Hemisphere, and, lastly, for those in the Southern Hemisphere.

Directions for finding the Principal Fixed Stars in and near the Zodiac.

The *Pleiades*, or *Seven Stars*, are in the Constellation Taurus, their declination is about 23½° N., and they pass the meridian a few minutes before 9 P.M., on the first day of the year. Nearly S.E. by E. from the Pleiades, at the distance of 14°, is *α* Taurus, or Aldebaran (1). This Star, which is sometimes called the *Bull's Eye*, has a reddish appearance, and is very easily known. Nearly in a line from the Pleiades, through Aldebaran, at the distance of 16° from the latter, is *γ* Orion, or *Bellatrix* (2): about 7½° E., a little northerly from Bellatrix, is *α* Orion, or *Betelguese* (1): this Star has a reddish appearance nearly like Aldebaran. About 9½° S.W. of Betelguese are three Stars of the

† The instrument, called a Cross Staff, which was formerly used in observing altitudes at sea, would measure the angular distance between two Stars with sufficient exactness for what is required here.

second magnitude, nearly in the same line with each other: these Stars are in the *Belt* of *Orion*. Nearly in a line from *Betelguese*, through the middle Star in the *Belt* of *Orion*, and at the distance of 9° from the Belt is β Orion, or *Rigel* (1): 8½° E. ½° S. from Rigel, and in a line from Bellatrix through the northern part of Orion's Belt, is κ Orion (2, 3). *Bellatrix*, *Betelguese*, *Rigel*, and κ *Orion*, form a trapezium round Orion's Belt, which is sometimes called the Square of Orion.

Nearly in the same line with the Pleiades and Orion's Belt, and about 21½° S.E. of the Southern Star of the Belt, is α Canis Major, or *Sirius* (1): this Star is often called the Dog Star; it is the brightest Fixed Star in the heavens. About 26° nearly East of Betelguese, and nearly the same distance N.E. of Sirius, is α Canis Minor, or *Procyon* (1, 2). *Sirius*, *Betelguese*, and *Procyon* form nearly an equilateral triangle. A line from *Rigel* through the middle of Orion's Belt will point out α *Gemini*, or *Castor* (1), the distance between *Rigel* and *Castor* being about 53°: 4½° to the S.E. of Castor is β Gemini or POLLUX (1): this Star passes the meridian about eleven minutes after *Castor*, and about 4½ minutes after *Procyon*.

At the distance of 37½° from *Procyon*, and nearly in a line with it and the Southern Star in Orion's Belt, is α LEO or REGULUS (1); and nearly in the same line, at the distance of 24½° E. by N. from REGULUS is β LEO or *Deneb* (2): about 35½° E.N.E. from *Deneb*, or a little North of a line from REGULUS through *Deneb*, is α Bootes or *Arcturus* (1): about 33° S.S.W. of *Arcturus*, and 35° S.E. of *Deneb*, is α Virgo or SPICA (1). *Deneb*, *Arcturus*, and SPICA form nearly an equilateral triangle, and nearly in the centre of this triangle is ε Virgo or *Vindemiatrix* (2, 3).

Nearly in a line from REGULUS, through SPICA, at the distance of 46½° from the latter, is α Scorpio, or ANTARES (1): this Star has a reddish appearance, like ALDEBARAN, or *Betelguese*. A little North of a line joining SPICA and ANTARES, and about 21° from SPICA, is α Libra, or *Zubenesch* (2, 3): this is a double Star, about 9° N.E. of *Zubenesch*, is β Libra, or *Zubenelg* (2, 3). At the distance of 60° N.E. by E. from ANTARES, is α Aquila, or ALTAIR: this Star may also be known by its being 100° E. by N. from SPICA, and a little North of a line from SPICA, through *Zubenelg*, and by its being situated in the southern border of the Milky Way, considerably distant from any other bright Star.

About 14° N.E. by E. of ALTAIR are four Stars of the third or fourth magnitude, in the Constellation Delphinus: these four Stars are very near each other, and form a kind of lozenge or diamond figure. A line from ALTAIR, through this figure, at the distance of 49° from ALTAIR, will point out β Pegasus, or *Scheat* (2). 14° E. of *Scheat*, is α Andromeda, or *Alpheratz* (2). 14° S., a little westerly from *Alpheratz*, is γ Pegasus, or *Algenib* (2). 17° nearly West of *Algenib*, and 13° S. of *Scheat*, is α Pegasus or MARCAB (2). *Scheat*, *Alpheratz*, *Algenib*, and MARCAB form what is generally called the Square of the

Pegasus, or the Flying Horse; MARCAB being in the South-West corner of the Square.

A line from *Scheat*, through MARCAB, being produced to the distance of 44° from the latter Star, will point out α Pisces Australis, or FOMALHAUT (1). ALTAIR, MARCAB, and FOMALHAUT form nearly a right-angled triangle, the right angle being at MARCAB. Nearly in a line joining MARCAB and the Pleiades, and about 23° W. of the latter, is α Aries, or ARIETIS (2, 3). ARIETIS may also be known by being a little to the South-West of a line from Betelguse, through ALDEBARAN, its distance from the latter Star being 36½°. About 4° S.W. by W. from ARIETIS is β Aries (3). 23½° S.E. by S. from ARIETIS, and a little North of a line from *Betelguese* through *Bellatrix*, at the distance of 36° from the latter Star, is α Cetus, or *Menkar* (2). *Menkar* may also be known by being in a line with *Rigel* and *Algenib*, and rather nearer to *Rigel* than to *Algenib*. About 5° W.S.W. of *Menkar* is γ Cetus (3).

DIRECTIONS FOR KNOWING THE PRINCIPAL FIXED STARS IN THE NORTHERN HEMISPHERE.

The *Pole Star*, or α *Ursa Minor*, is very generally known. This Star is between the second and third magnitudes, and is situated in the point of the tail of the Little Bear. A line from *Procyon* through *Castor* will nearly fall into the *Pole Star*, at the distance of 58° from *Castor*.

The most conspicuous Constellation near the North Pole is Ursa Major, or the Great Bear; there are seven bright Stars in this Constellation, between the first and third magnitudes. When these Stars are near the meridian, above the Pole, the four western Stars form a trapezium, and because a line through the two Stars farthest to the westward will nearly fall into the *Pole Star*; they are called the *Pointers*. The northern pointer is α Ursa Major, or *Dubhe* (2, 1): and the southern pointer, or that farthest from the Pole Star, is β Ursa Major (2). The most northern of the two eastern Stars of the trapezium is δ Ursa Major, and the other is γ. These four Stars are in the body of the Great Bear. The three remaining Stars are in the tail; that next the body is ε Ursa Major, or *Alioth* (2, 3); the next to this is ζ, or *Alcor* (2, 3); and the one in the point of the tail is η, or *Benetnasch* (2, 3). The seven most conspicuous Stars in Ursa Minor form a figure which has a great resemblance to that formed by the seven Stars already described in Ursa Major; α Ursa Minor, or the *Pole Star*, being, as before observed, in the point of the tail.

A line from *Rigel* to the *Pole Star* will nearly intersect α Auriga, or *Capella* (1). This Star is 43½° from the *Pole Star*, and 54° from *Rigel*. *Capella* may also be known by its being in a line from *Menkar* through the *Pleiades*, and about 28° to the N.E. of that cluster. About 7½° E. by S. from *Capella* is β Auriga (2, 3).

Nearly in a line between *Benetnasch*, the Star in the point of the tail of the Great Bear, and *Deneb*, in the tail of the Lion, is α Cor Caroli (3). This Star is about 28° from *Deneb*, and 14½° from *Benetnasch*. A little East of a line joining α Cor Caroli and *Deneb*, is the nebulous Constellation of Coma Berenices.

About 26½° from the *Pole Star*, and nearly in a line joining it and *Arcturus*, is α Draco (2, 3). About 19° E.N.E. of *Arcturus*, and nearly in a line with *Dubhe* and *Alcor*, is α Corona Borealis, or *Alphacca* (2). *Alphacca*, and seven other Stars of the fourth and fifth magnitudes, form a circular figure, which is very easily distinguished: these eight Stars are all in the Constellation of the Northern Crown.

A line from *Arcturus*, through the northern part of the circular figure in the Northern Crown, will point out α *Lyra*, or *Vega* (1); the distance between *Arcturus* and *Vega* being 59°. About 24° E.N.E. of *Vega* is α Cygnus, or *Arided* (2, 1).† *Vega*, *Arided*, and ALTAIR, form nearly a right-angled triangle, the right angle being at *Vega*. ALTAIR is about 34½° from *Vega*, and 38° from *Arided*.

About 18° N.N.E. from *Arided* is α Cepheus, or *Alderamin* (3); and 20½° E. by N. from *Alderamin* is β Cassiopeia (2, 3): this Star, *Scheat*, and *Arided*, form nearly an equilateral triangle, the side of which is about 33½°. At the distance of 5° nearly East of β Cassiopeia is α Cassiopeia, or *Schedar* (2, 3). Some of the Stars in the Constellation of Cassiopeia form a figure which resembles a chair.

A line from *Alioth* (the Star in the tail of the Great Bear, which is nearest to the body), through the *Pole Star*, being continued, will pass through the middle of the Constellation of Cassiopeia: the principal Stars in this Constellation are nearly at the same distance from the *Pole Star* as those of the Great Bear.

Nearly in a line with *Schedar* and β Cassiopeia, at the distance of 19½° from *Schedar*, is γ Andromeda, or *Almaach* (2); and about 13° W.S.W. of *Almaach*, is β Andromeda, or *Mirach* (2): this Star, with β Cassiopeia and *Almaach*, forms nearly a right-angled triangle, the right angle being at *Almaach*.

About 12° E.S.E. from Almaach is β Perseus, or *Algol*: this is one of the most remarkable of the *Variable Stars*, it being when brightest of the second *magnitude*, and when least bright only of the fourth. About 9½° N.N.E. of *Algol* is α Perseus, or *Algenib* (2): this Star may also be known by being nearly in a line with POLLUX and *Capella*, and about 19° to the W.N.W. of the latter.

† This Star is often called *Deneb*, as well as *Arided*; we have chosen the latter name in order to distinguish it from *Deneb* in the tail of the Lion.

Directions for finding the Principal Fixed Stars in the Southern Hemisphere.

A little West of a line from Aldebaran through *Rigel*, at the distance of 46½° from the latter Star, is α Argo Navis, or *Canopus* (1): this is a very bright Star, and may also be known by its being a little East of a line from *Castor* through *Sirius*, and about 37½° nearly South of the latter Star. About 20° N.N.W. of *Canopus*, is α Columba Noachi (2).

In a line from *Betelgueze* through *Sirius*, and about 73° from the latter Star, are four bright Stars, forming the Constellation called Crux, or the Cross. The Stars in this Constellation are disposed as follows: α (1) is the most southern Star, and is in the foot of the Cross; β (1, 2) is in the Eastern arm; γ (2) in the head, and δ (3) in the Western arm. About 12° E.N.E. of α Crux, is β Centaurus (1), and 5° East of this Star, is α Centaurus (1).†

About 42° East, a little Northern from α Centaurus, and 52° S. by E. of Antares, is α Pavo (2). About 40° East of α Pavo, and 39° S.E. by S. of Fomalhaut, is α Eridanus, or *Achernar*; these three Stars form nearly an equilateral triangle.

A line from *Castor* through Pollux, will point out α Hydra, or *Alphard* (2); this Star being about 44° to the S.E. of Pollux, and 23° S.S.W. of Regulus. *Procyon*, *Alphard*, and Regulus form nearly a right angled triangle, the right angle being at *Alphard*.

On finding the Latitude by the Fixed Stars.

The best times for observing the Altitude of a Star, is during the morning or evening twilight, or when there is moonlight; the horizon being more distinct at these times than it is when the night is dark. A little practice will, however, enable a person to take the Altitude of a Star with sufficient accuracy, for nautical purposes, during any tolerably clear night.

When observing the Altitude of a Star by the common Quadrant, the horizon will be better seen if the *sight vane* be turned horizontally, and the sight directed over it, instead of through the hole.

† It must be observed, that when circumpolar Stars are near the meridian below the Pole, the bearing or direction between the Stars appears to be reversed: thus the pointers to the North Pole Star, which are the two western of the seven bright Stars in the *Great Bear*, appear to be to the eastward of the others, when that constellation is near the meridian below the Pole.

To find the Latitude by the Meridian Altitude of a Fixed Star.

RULE.

I. From the Observed Altitude of the Star subtract the Correction from Table XXVII., the remainder will be the true Altitude, which being subtracted from 90°, will give the Star's Zenith Distance, which is to be called North or South, according as the observer is North or South of the Star when its Altitude is observed.

2. Find the declination of the Star by the Table of Fixed Stars, p. 432, Nautical Almanac. Then if the zenith distance and declination be both North, or both South, add them together, the *sum* will be the latitude of the same name with the declination; but if one be North and the other South, their *difference* will be the latitude, of the same name with the greater. (*See* N. A., p. 584.)

EXAMPLE.

1844, May 10, required the latitude where the observed meridian altitude of *Arcturus*, south of the observer, is 63° 24′, the height of the eye being 18 feet?

Observed altitude of Arcturus		63°	24′ ·0
Correction from Table XXVII.		—	4 ·8
Star's true altitude		63	19 ·2
		90	
Star's zenith distance		26	40 ·8 N.
Decl. of Arcturus from N. A. 19° 59′ 49″·67 N.			
Ann. var. 18″·941 × ·356 fraction of the year = — 6 ·74	Decl. May 10	19	59 ·7 N.
Latitude		46	40 ·5 N.

When the altitude of a Star is observed on the meridian *below* the Pole, the latitude is found by adding together the Star's true altitude and its polar distance. The latitude will, in this case, be always of the same name with the declination of the Star.

EXAMPLE.

1844. The altitude of γ Draco, or *Rastaban*, observed on the meridian, below the Pole, being 14° 11′, and the height of the eye 12 feet: required the latitude?

Observed altitude of *Rastaban*		14°	11′·0
Correction from Table XXVII.		-	7·1
Star's true altitude		14	3·9
90—51° 30′·5 the Star's decl. = Star's polar distance		38	29·5 N.
Latitude		52	33·4 N.

The time of a Star's passing the meridian, below the Pole, is 11h. 58m. different from the time when it passes the opposite meridian; therefore 11h. 58m. being subtracted from the time of a Star's passing the meridian, as found by its R. A. from the table of Fixed Stars, p. 432 N. A. and Table XXVI., the remainder will shew the time of the *preceding* transit below the Pole, or if 11h. 58m. be added to the time of a Star's passing the meridian, as found above, the sum will be the time of the *following* transit below the Pole.

EXPLANATION

OF

THE TABLES.

TABLE A.

For converting Mean Time, Hours, &c., &c., into their Equivalents in Sidereal Time.

The accelerations are portions of sidereal time to be added to mean time. It is also used for reducing the sidereal time mean noon, as found in the Nautical Almanac, to any other meridian. Add the acceleration in West longitude to the sidereal time mean noon; subtract it in East longitude; when the exact longitude is not found at once, it will be necessary to enter the Table, with such portions of it, as will make up the amount; and the corresponding accelerations added together, will be the acceleration for the whole longitude.

TABLE R.

For reducing Sidereal Hours, Minutes, &c., to their Equivalents in Mean Time.

'R. portions of mean time, to be subtracted.

TABLE P.

The parallax in altitude of the Planets to be deducted from the refraction corresponding to the altitude, the result is the Planet's correction of altitude. The Star's correction of altitude is the refraction. (*See* Example, p. 20, and Table VI.)

TABLE I.

To reduce Longitude into Time, or Time into Longitude.

The use of this Table will be easily understood by attending to the following Examples:

I.

What time answers to longitude 77° 42′ 30″?

					h.	m.	s.
	77°	0′	0″	=	5	8	0
	42	0		=		2	48
		30		=			2
Time required - - -					5	10	50

II.

Required the longitude answering to 7h. 23m. 28s.?

h.	m.	s.				
7	20	0	=	110°	0′	0″
	3	28	=		52	0
Longitude required - -				110	52	0

This Table being chiefly intended to turn longitude into time, and the contrary, is only extended to 180°, and to 12h.; it is, however, easy to find the time answering to an arc greater than 180°, or the corresponding arc for a given time exceeding 12h.; for Example,

Let it be required to turn the arc 269° 21′ 44″ into time?

						h.	m.	s.
Arc - - - - -	269°	21′	44″					
Subtract - - - -	180	0	0		=	12	0	0
Remainder - - -	89	21	44	and 89°	=	5	56	0
				21′	=		1	24
				44″	=			3
Arc in time - - - - - - - - - - - - - - - - -						17	57	27

In a similar manner may the *arc* be found, for any time, between 12 and 24 hours.

TABLE II.

Dip of the Horizon.

This Table contains the Dip, or Depression of the visible Horizon of the Sea, when the sight is unobstructed. The dip is always to be subtracted from altitudes observed by the fore observation; but if the

back observation be used. the dip must be added to the observed altitude.

TABLE III.

Dip of the Horizon, at different Distances, from the Observer.

If the Image of the Sun, or any other celestial object, be brought in contact with the surface of the water, at any point nearer to the Observer than the most distant visible horizon, it is plain that the dip will be greater than that given in Table II.; therefore in situations near the land, when the Sun or other object is over it, the dip is to be taken from this Table. Thus, if the height of the eye of an observer be 20 feet, and his distance from the land 1 mile, the dip is 11 minutes.

The distance from the land can generally be estimated with sufficient accuracy, particularly if the distance exceeds a mile, and the height of the eye not greater than 20 feet: if the height be more than 20 feet, and distance less than a mile, it is necessary to be very exact in both the arguments.

TABLE IV.

Moon's Augmentation.

The Moon's apparent semidiameter, as given in the Nautical Almanac, is adapted to her distance from the centre of the Earth. But when the Moon is in the zenith of any place, she is nearer to an observer, in that place, than she is to the Earth's centre by about 4000 English miles (the diameter of the Earth being nearly 8000 miles), now the Moon's mean distance from the Earth's centre being about 240,000 miles, it is evident that the Moon's diameter will appear under an angle $\frac{1}{60}$th part greater to a person who is nearer to her by 4000 miles, for $240{,}000 \div 4000 = 60$; and as the Moon's semidiameter, when at her mean distance from the Earth, is about 15′ 42″, the greatest augmentation of the Moon's semidiameter will in this case be 15″ 42‴, that is, one 60th of 15′ 42″. When the Moon is nearer to the Earth than her mean distance, the greatest augmentation of semidiameter exceeds 15″ 42‴, and the contrary is the case, when the Moon's distance is greater than her mean distance from the Earth.

When the Moon is in the horizon of any place, her distance from that place is so nearly the same as the distance from the Earth's centre, that the augmentation is insensible. Supposing the Moon's distance from the Earth to remain the same, as her altitude increases she approaches an observer, and therefore, at any altitude between 0° and 90°, the augmentation will be between 0″, and the Moon's greatest augmentation of semidiameter.

TABLE V.

Contraction of Semidiameter of the Sun or Moon.

As the effect of refraction is greater on the lower limb of the Sun, or Moon, than on the upper limb, the apparent vertical diameter is always less than the apparent horizontal diameter, in a quantity equal to the difference of the refractions on the upper and lower limbs. Thus, if the observed altitude of the Sun's lower limb be 3° 0′, when his diameter, by the Nautical Almanac, is 32′, the observed altitude of the upper limb will not be 3° 32′, but only 3° 30′ 30″, because the refraction on an object, when it is apparently 3° above the horizon, is 14′ 36″; but when the apparent altitude of an object is 3° 30′, the refraction is only 13′ 6″, in this case, therefore, the horizontal diameter of the Sun would be greater than the vertical diameter by 1′ 30″, for the contraction of the vertical semidiameter would be 45″.

When the distance between the Sun and Moon is observed, if the altitude of either object be less than 12°, and the altitude of the other above 20°, the correction from this Table ought to be *subtracted* from the semidiameter of the lower object, before it is applied to the observed distance.

When the altitudes of the objects are nearly the same, when the distance is observed, no correction is necessary. When the objects are both in the same azimuth circle, or in opposite azimuth circles, a line from the centre of either object, to that part of the limb from which the distance is taken, will make an angle of 90° with the horizon, therefore, the whole effect of the difference of refraction on the centre of the object, and the observed limb, must be applied to the semidiameter. When the objects are in any other position, the angle with the horizon may be estimated with sufficient exactness, by taking notice of the inclination of the plane of the Sextant with the horizon, at the same time the distance is observed.

The inclination which a plane, passing through the two objects, has to the horizon, is found at the top; and the apparent altitude, in the left-hand side column under the former, and opposite to the latter, is the contraction of semidiameter.

EXAMPLE.

The Moon's semidiameter being 16′ 4″ by the Nautical Almanac, when her apparent altitude is 6° 40′, and the inclination to the horizon of the plane passing through the Sun and Moon 78°: required the semidiameter to be applied to the observed distance?

Moon's horizontal semidiameter - - - - -	16′	4″
Moon's augmentation of semid. by Table IV. -	+	2
Contraction of the Moon's semidiameter - -	—	15
Semid. to be applied to the observed distance -	15	51

TABLE VI.

Corrections of the Apparent Altitudes of the Sun and Stars.

The Sun's correction in this Table is the mean refraction in altitude, lessened by the effect of the parallax of the Sun, on the same altitude. The Star's correction is the mean refraction in altitude.

Note.—The correction of the Sun's altitude should be taken out for the apparent altitude of the observed limb, and not for the apparent altitude of the Sun's centre. By this means the error in altitude, arising from the contraction of the Sun's vertical semidiameter, will be avoided.

TABLE VII.

To Correct the Mean Refraction.

The corrections in Table VI. are calculated for that state of the atmosphere, in which the height of the Barometer is 29·6 inches, and the height of Farenheit's Thermometer 50°; but a variation in either the *weight* or *temperature* of the air, causes a difference in the quantity of the refraction, it is therefore necessary when the altitude of an object is low, and great accuracy required, to apply the corrections from this table, to the correction found in Table VI. for any variation, in the height of the Barometer, from 29·6 inches, and in the height of the Thermometer, from 50°.

EXAMPLE.

The apparent altitude of the Sun being 6° when the Barometer stands at 29·75 inches, and the Thermometer at 76°: required the proper correction of the Sun in altitude?

Correction for Sun's apparent altitude 6° from Table VI - -	8′	18″
Opposite app. alt. 6°, and under height of Ther. 76°, is - - -	—	31
Opposite app. alt. 6°, and over height of Bar. 29·75, is - - -	+	2
Correction required - - - - - - - - - - - - - - - -	7	49

TABLE VIII.

Correction of the Moon's Semidiameter, or Horizontal Parallax, for any given time, between Noon and Midnight, or of the Sun's Declination for a given time, from the preceding noon.

This is a Table of proportional parts. The corrections to be applied to the Moon's semidiameter and horizontal parallax, as given in the Nautical Almanac at noon or midnight, so as to reduce them to any other Greenwich time, may be accurately found by this Table.

If the Sun's declination be required to the nearest second, the correction may be found by Table X.

TABLE IX.

Altitudes by which the Apparent Time, or Horary Angle, may be found with the greatest accuracy.

When an object is observed in the prime vertical, the time, deduced from its altitude, is likely to be more correct than when the object is in any other position, because, when a body bears due *East* or *West*, its change of altitude is quickest, and any probable error, either in the latitude of the place of observation, or in the declination of the observed object, will cause very little error in the time: and the best situation of an object that does not come to the prime vertical is when its motion coincides with an azimuth circle. This Table will shew the altitude of an object when in either of these positions.

For example. The latitude of place being 51° 30′ N., and the declination of the Sun or a Star 21° N.; the best time to observe the altitude, for ascertaining the time, is when the altitude is about 27°; or if the latitude of a place be 14° S., and the declination of an object 24° S., the most favorable altitude for finding the time is 37°.

This table is only useful when the latitude of the place of observation, and the declination of the object, are of the same name. When these are of different names, the best time to observe the altitude is when its height is from 5° to 15°, according to circumstances.

Note.—The apparent time is the Sun's horary, or hour angle. The horary angles of the Moon, Planets, and Stars, may be called measures of sidereal time.

TABLE X.

Logarithms for finding the Correction of the Sun's Declination, &c. &c.

This table is chiefly intended to find the proportional part of the daily variation of the Sun's declination, or right ascension, for any given time at Greenwich; the numbers at the top or bottom of the table may be esteemed as *Hours, Degrees*, or *Minutes*, and those in the side columns as *Minutes*, or *Seconds*, according as the numbers at the top are estimated.

PROBLEM I.

To find the Proportional Part of the Daily Variation of the Sun's Declination or Right Ascension, for any given time at Greenwich.

RULE.

Add together the logarithms of the Greenwich time, and the daily variation, the sum will be the logarithm of the proportional part required.

EXAMPLE I.

Suppose the variation of the Sun's declination in 24h. is 19′ 37″ required the proportional part for 15h. 49m.?

	h.	m.	
Greenwich time - - - -	15	49	Log. 0·1811
Variation in 24 hours - - -	19′	37″	Log. 0·0876
Proportional part required - -	12	56	Log. 0·2687

EXAMPLE II.

Let the change of the Sun's right ascension be 3m. 55s. in 24 hours, what would be the proportional part for 11h. 13m.?†

	h.	m.	s.	
Time at Greenwich - -	11	13	0·0	Log. 0·3303
Variation of ⊙'s R. A. in 24 hours		3	55·0	Log. 0·7873
Proportional part required -		1	49·8	Log. 1·1176

Where the difference for one hour is given, it is needless to employ logarithms to take a proportionate part.

TABLE XI.

Logarithms of the Latitude and Polar Distance.

This table contains the logarithmic secants of the latitude, and the co-secants of the polar distance, 10 being rejected from the index. The degrees of latitude are always found at the top, and the minutes in the left-hand column, and also those of the polar distance, when it exceeds 90°. When the polar distance is less than 90°, the degrees are always found at the bottom, and the minutes in the right-hand column.

Note.—In this, and in all the other Tables, where the quantities at the top and bottom are different, the numbers for the minutes, &c. in the *left-hand* column belong to the quantities at the top, and those in the *right-hand* column to the degrees, &c. at the bottom.

† See Art. 13, Introduction.

TABLE XII.

Logarithms of the Half Sum, and Difference.

This table contains the logarithmic co-sines of the half sums, and the log. sines of the differences, the index of each being diminished by 5. The degrees of the half sum are always found at the top, and those of the difference at the bottom.

TABLE XIII.

Logarithms of the Apparent Time or Horary Angle.

The logarithms in this table are twice the logarithmic sines of half their respective horary angles, less 10 in the index. When the time is inferred from the altitude of the Sun, the apparent astronomical time is found in this Table, the hours at the top being used when the Sun is observed *West* of the meridian, and those at the bottom when the observation has been made *East* of the meridian. The logarithms are given for every tenth second of time, as far as 9 hours from the meridian, and by the proportional parts in each page the odd seconds may be very readily found by inspection.

EXAMPLES.

I. What is the apparent time answering to the Logarithm 9·46381, the Sun having been observed West of the Meridian.

Given Logarithm			9·46381
Logarithm of	4h. 21m. 0s.	=	9·46340
This difference gives nearest	8		41 Diff.
Apparent time required	4 21 8		

II. The Sun having been observed *East* of the Meridian, required the apparent time when the Logarithm is 9·32246?

Given Logarithm			9·32246
Logarithm of	20h. 21m. 40s.	=	9·32272
This difference gives nearest	4		26 Diff.
Apparent time required	20 21 44		

When the Sun is observed *West* of the meridian, the given Logarithm will be *greater* than the Logarithm in the table, answering to the next less tenth second of time; but when the observation is made *East* of the meridian, the contrary is the case.

The *Horary Angle* of a Star is to be taken out in the same manner, in every respect, as the apparent time when the Sun is observed, that is, the *horary distance* of the Star, *West* of the meridian, is to be understood as the *Horary Angle* of the Star, therefore, when a Star is observed *West* of the meridian, its meridian distance will be less than 12 hours; but if the observation is made when the Star is *East* of the meridian, the horary angle, or distance of the Star reckoned westward from the meridian, is greater than 12 hours, for it is the complement to 24 hours of the Star's horary distance *East* of the meridian.

If very great accuracy be required in taking out the time, the proportional parts will show the tenths of a second in the time. Thus, in the first Example, the difference between the given Logarithm, and the one in the table for the next less tenth second, is 41, but the parts for 8s. are only 39, therefore there is 2 of a remainder; place a cypher to the right of this remainder, which will make it 20; then above this will be found 4s., which are to be esteemed 4 tenths of a second: hence the apparent time answering to the Logarithm 9·46381 is 4h. 21m. 8·4s.

NOTE.—In Table XIII. when the Index changes in any part of a line, the Index Figures are placed opposite to the line like a vulgar fraction: For example, at page 28, opposite to 27m will be found two Index Figures, placed thus $\frac{8}{9}$, the 8 being the Index as far as 2h. 27m. 20s. the 9 commences at 2h. 27m. 30s. the logarithm of the first of these times being 8,99917, and that of the second 9,00012.

TABLE XIV.

Logarithms of the Moon's Horizontal Parallax.

TABLE XV.

Logarithms of the Apparent Altitudes.

These tables require no explanation with respect to the manner of using them; but it may be observed, that the Logarithms in Table XIV. are the Proportional Logarithms of the Moon's Horizontal Parallax, each being lessened by 4600, and a Logarithm of any Apparent Altitude is the Log. Co-Secant of that arc, lessened by 9,5400. This was done with the view of having the Logarithms of the Moon's horizontal parallax at each opening of the book, in Table XV., but it was found inconvenient in printing.

TABLE XVI.

Logarithms of the Apparent Distance.

The Logarithms in this Table are titled Log. S., and Log. T., the

first being the log. sine and the other the log. tangent of any given Apparent Distance, 9 being rejected from the index. When the Apparent Distance is less than 90°, the degrees of distance will be found at the top; when the distance exceeds 90°, the degrees of distance are found at the bottom. In this Table, as far as 53° of distance, the minutes in both the marginal columns are the same, and therefore either may be used; above 53°, the minutes in the left-hand column belong to the degrees at the top, and those in the right-hand column to the bottom degrees. For example, when the apparent distance is 35° 26′, the Log. S. is 0·7632, and the Log. T. 0·8522; or for apparent distance 112° 18′; the Log. S. is 0·9662, and the Log. T. 1·3871.

TABLE XVII.

Logarithms of the First and Second Corrections.

The degrees and minutes of the *first correction* are always to be taken from the top, and the seconds from the left-hand column; also when the apparent distance exceeds 90°, the *second correction* is to be taken out in the same manner; but when the distance is less than 90°, the degrees and minutes of the *second correction* must be taken from the bottom, and the seconds from the right-hand marginal column.

EXAMPLES.

I. The first correction answering to the Logarithms 1·5765 is 4° 12′ 16″.

II. When the Logarithm of the first correction is 1·3462, the first correction will be 3° 38′ 23″.

III. When the apparent distance exceeds 90°, the second correction, answering to the logarithm 2·1031, is 4° 45′ 48″.

IV. The apparent distance being less than 90°, and logarithm of the second correction 1·7320, the second correction will be 5° 33′ 22″.

Both the first and second corrections are *always* to be *added* to the apparent distance.

TABLE XVIII.

Third Correction.

This correction (like the first and second) is *always* to be *added* to the apparent distance; the distance nearest to the given apparent distance is to be found in the Table; then look for the altitude at the

top or bottom which is nearest the given apparent altitude of the Sun or Star, and in a side column for the altitude which is nearest to the given apparent altitude of the Moon; under the former, and opposite to the latter, will be found the *third* correction. Thus, when the apparent distance is 52°, the Star's apparent altitude 38°, and that of the Moon 20°, the third correction is 1′ 35″; or when the apparent distance is 79° 36′ 20″, the apparent altitude of the Star 25° 30′, and that of the Moon 41° 15′, the third correction is 1′ 48″.

When the given distance and altitudes differ considerably from those in the Table, it will be proper to make a corresponding allowance on the *third correction.*

For example: Let the given apparent distance be 61° 24′, the Star's altitude 36°, and the Moon's 22°; at apparent distance 60°, under 36°, and opposite 22° is 1′ 29″, but at apparent distance 64°, the given altitudes give 1′ 33″, therefore, the third correction, for the given apparent distance and altitudes, will be 1′ 30″. The differences in the corrections given in the Table, being in general very small, the third correction may be almost always found at sight for any given distances and altitudes.

The small Tables, which are titled TABLE P., contain the effect of the Sun's parallax for the respective distances under which they are placed, when the distance between the Sun and Moon is observed; the effect of the Sun's parallax is to be taken from this Table, and applied to the third correction before it be added to the apparent distance.

The seconds found above the line in the columns are to be added to the third correction, and those found below that mark are to be subtracted from the third correction. For example, at apparent distance 52°, when the Sun's altitude is 50° and the Moon's 10°, the effect of the Sun's parallax on the distance is 3″, and this being found above the line, it is to be added to the third correction, found in Table XVIII.; hence the third correction will be 4′ 7″ for the distance between the Sun and Moon, or 3″ greater than it would be if the distance were between the Moon and a Fixed Star. Again, at the same distance, if the Sun's altitude be 10° and that of the Moon 50°, the effect of the Sun's parallax on the distance is 8″, to be subtracted from the third correction, because it is found below the line, therefore the third correction would be 3′ 59″, or 8″ less than if the distance were between the Moon and a Star.

The effect of the Sun's parallax on the distance can never exceed 9″. When the distance is less than 84°, the effect of the Sun's parallax may be either additive or subtractive: but when the distance is greater than 84°, the effect of the Sun's parallax is always subtractive from the apparent distance, or, which is the same thing, the third correction is always to be diminished, by the effect of the Sun's parallax, before that correction be added to the apparent distance.

TABLE XIX.

Proportional Logarithms.

The principal use of this Table is to find the mean time at Greenwich, corresponding to a given true distance between the Moon and the Sun or a Star; this is exemplified in Problem IV., page 14. The mode of taking out the proportional logarithm for any given arc or time, or of finding the time, &c., for any given logarithm is obvious. Thus the logarithm for 1° 16′ 38″, or 1h. 16m. 38s., is the same, *viz.*, 0·3709, and the time answering to the logarithm 1·3416 is 0h. 8m. 12s.; or the arc in degrees, &c., is 0° 8′ 12″.

The index of a proportional logarithm, above 0h. 18m. or 0° 18′, is always 0.

TABLE XX.

Correction of the Apparent Altitude of the Sun or a fixed Star.

This Table is the same as Table VI.

TABLE XXI.

Correction of the Moon's Apparent Altitude.

This Table contains the correction of the Moon's apparent altitude for every tenth minute of altitude, and for each minute of the Moon's horizontal parallax. Thus, the correction of the Moon's apparent altitude 14° 20′, when the Moon's horizontal parallax is 56′, is 50′ 35″. The proportional parts for the seconds of the Moon's horizontal parallax, and for the minutes of the altitude 0′, 10′, 20′, &c., are found on the right of the page. These proportional parts are always additive, as well as the correction itself.

It must be observed, that when the Moon's apparent altitude is greater than 17°, the parts in the right hand opposite to 0′ of altitude are to be applied, these are always 10″. Thus, the correction for the Moon's apparent altitude 28° 40′ and horizontal parallax 60′, is 50′ 45″ in the Table, this is to be called 50′ 55″, and so on.

EXAMPLES.

When the Moon's apparent altitude is 35° 46′ and horizontal parallax 58′ 27″, required the correction in altitude?

Opposite 35° 40′ and under 58′ hor. par. is - -	45′ 38″
Opposite 20° and under 7″ of hor. par. is - -	+ 22
Opposite 6′ of altitude is - - - - - -	+ 7
Correction for Moon's Altitude 35° 46′, and hor. par. 58′ 27″	46 7

Sometimes the Moon's horizontal parallax is a few seconds less than 54′, in that case the correction may be found as follows. (*See* Art. 6, Problem VI.)

Find the correction for the given altitude and 54′ of horizontal parallax, and then from this correction subtract the parts for the number of seconds which the given horizontal parallax wants of 54′, the remainder will be the correction required.

The Moon's apparent altitude being 48° 24′ and horizontal parallax 53′ 55″, required the correction in altitude.

Opposite to 48° 20′ and under 54′ of hor. par. is	34′ 53′
Opposite to 4′ of altitude is	7
Correction for the given Altitude and 54′ hor. par.	35 0
53′ 55″ is 5″ less than 54 and 5″ gives	— 3
Correction required	34 57

TABLE XXII.

Logarithms of the Moon's Apparent Altitude.

The logarithm of the Moon's apparent altitude is found in the page opposite to the Moon's correction in altitude, and is to be taken out in the same manner, observing to add the parts for the apparent altitude of the Sun or Star, given at the bottom of each page.

EXAMPLES.

I. What is the logarithm for the Moon's apparent altitude 19° 24′, when the horizontal parallax is 55° 38′, and the Sun's apparent altitude 36°?

Opposite to 19° 20′ and under 55′ of hor. par. is	4·298818
- - to 30″ and under 8″ of hor. par. is	+ 22
- - to 4 of Moon's app. alt. is	+ 12
- - to mark ⊙ and under 36° is	+ 19
Logarithm required	4·298871

II. Suppose the Moon's apparent altitude is 52° 30′ and horizontal parallax 58′ 0″, and the altitude of a Star from which the Moon's distance is observed 38° 20′, required the logarithm of the Moon's apparent altitude?

Opposite to 52° 30′ and under 58′ of hor. par. is	4·295197
- - to 0″ and under 0″ of hor. par. is	+ 150
- - to 0′ of Moon's Altitude is	+ 20
- - to the mark * and under 38° is	+ 30
Logarithm required	4·295397

If the Moon's horizl. parallax be less than 54′, take out the logarithm for 54′, and the number of seconds in the given horizontal parallax, and then add the difference between the logarithms of the given altitude, under 54′ and 55′ of horizontal parallax, the sum will be the logarithm required.

Thus, suppose the Moon's apparent altitude was 34° 26′ and horizontal parallax, 53′ 53″, and the Sun's altitude 48° 30′, the logarithm will be found as follows:

Opposite to 34° 20′ and under 54′ of hor. par. is - - - -	4·297172
- - to 50″ and under 3″ of hor. par. is - - - - -	+ 85
- - to 6′ of Moon's Altitude is - - - - - -	+ 10
- - to the mark ⊙ and under 50° is - - - - -	+ 16
The difference of the Logs. opposite to 34° 20′ and under 54′ and 55′ is	+ 74
Logarithm required - - -	4·297357

TABLE XXIII.

Logarithms of the Sum and Difference.

The *sum* means the sum of the apparent distance and the difference of the apparent altitudes of the objects, and the *difference* is what remains of the apparent distance when the difference of the apparent altitudes is subtracted therefrom. The degrees of the sum or difference are found at the top, and the minutes in a side column, under the former and opposite to the latter is the logarithm. Thus, if the difference be 48° 24′ and the sum 86° 38′, the logarithm of the difference will be 0·612702, and that of the sum 0·836343.

TABLE XXIV.

Logarithms of Numbers.

This is a Table of common logarithms. In correcting a lunar distance by the method for which this Table is introduced, it is only required to find a natural number corresponding to a given logarithm, which may be done as follows:

When the Index of the given logarithm does not exceed 3, the required natural number is found at once, the number of integer figures being always one more than the Index of the logarithm. Thus, the number for the logarithm 2·439333 is 275, or the number for the logarithm 3·755036 is 5689.

When the Index exceeds 3, find the logarithm in the Table which is next less to the given one, this will be the logarithm of the first four figures of the required number. Find the difference between this next less logarithm and the given logarithm, call this the second

difference, place as many ciphers to the right of the second difference as the Index of the given logarithm exceeds 8, and then divide this by the first difference taken from the right-hand column, the quotient being placed to the right of the first four figures will give the required number. For example, suppose the number for the logarithm 5·758365 is wanted.

The given Logarithm is - - -	5·758365
The next less is the Logarithm of 5732 -	758306
Which gives the Second Difference -	59

Now, two Cyphers being placed to the right of this, it is to be divided by 76, the first difference, thus:

76)5900(77·6
532

580
532

480

Here the quotient is to be called 78, which being placed to the right of 5732 makes the number required = 573278

The above is the usual method of finding the figures exceeding 4 in a natural number from a given logarithm, but the proportional parts at the bottom of each page will give them more readily, by attending to the following directions. Find the first four figures with the first and second differences as before, then look for the first difference in either of the side columns at the bottom, and if the second difference is found at the top of the proportional parts, the required figures will be found under it in a line with the first difference; but if the second difference is not exactly found at the top, take out the figures which stand opposite to the first difference, and under the parts that make up the second difference at twice or thrice, if necessary, these figures being added together, will give the figures required in the natural number. The foregoing example would stand as follows:

Opposite to 76 and under 50 is - - -	66
- - - to 76 and under 9 is - - -	12
2 Right-hand figures as before - - =	78

The proportional parts at the bottom of the first 2 pages of the table, are intended to give the natural number to 7 places of figures, and the others to 6 places, this being all that is necessary in the method of correcting the lunar distances for which this table is intended. If the index of the given logarithm is only 4, then but 5 places or integers are required in the natural number. Therefore, what remains to the right of 5 figures will be a decimal part (the proportional parts being taken out as before). For example, let the given logarithm be 4·698338, to find the corresponding natural number.

The next less log. is 698275, which is the log. of 4992 (the first four figures), the first difference in the right-hand column is 87, and the differences between the 2 logs. is 63, which is the second difference. Now,

Opposite to 87 and under 60 is - - -	69
- - - to 87 and under 3 is - - -	03
	72

Hence, the natural number required will be 49927·2.

Suppose the logarithm 6·109432 is given to find the natural number. The next less logarithm is 109241, which gives the first four figures 1286, the first difference 338, and the second difference 191. Now,

Opposite to 338 and under 100 is - -	296
- - - to 338 and under 90 is - -	266
- - - to 338 and under 1 is - -	003
Which gives the 3 right-hand figures - -	565
Therefore the natural number will be -	1286565

If the given logarithm be found exactly in the Table, the right-hand figures of the natural number will be cyphers. Thus, the natural number for the logarithm 5·949732 is 890700.

TABLE XXV.

Natural Versed Sines.

By this Table the natural versed sine of an arc, consisting of degrees, minutes, and seconds, or, the degrees, minutes, and seconds answering to a given natural versed sine will be found.

I. To find the natural versed sine for an arc, consisting of degrees, minutes, and seconds. Find the degrees at the top, and the minutes in a side column, under the former, and opposite the latter, will be found the natural versed sine for the degrees and minutes, find the seconds in a side column, then opposite to them in the column of parts, to the right of the given degrees, are the parts for seconds, which being added to the natural versed sine for degrees and minutes, will give the natural versed sine required.

EXAMPLE.

What is the natural versed sine for the arc 38° 53′ 17″.

Under 38° and opposite 53′ is - -	221574
Opposite 17″ is found in column of parts -	51
N. V. S. of 38° 53′ 17″ - - -	221625

II. To find the arc consisting of degrees, minutes, and seconds, answering to a given natural versed sine. Find the natural versed sine which is next less to the given one, above this will be found the degrees and opposite to it the minutes of the required arc; take the difference between the given natural versed sine and the next less one, look for this difference in the column of parts, to the right of the column where the natural versed sine of the degrees and minutes was found, opposite to these parts will be found seconds in the required arc.

EXAMPLE.

What is the arc in degrees, minutes, and seconds for the natural versed sine 743862?

The given N. V. S. - - - - - - - - -		743862
The next less is the N. V. S. of -	75° 9′ 0″ - -	743711
And 150 in the column of parts gives	+ 32	
		Parts 151
Arc required - - - - -	75° 9′ 32″	

It is seldom necessary to place more than two or three of the right-hand figures of the next less natural versed sine under the corresponding figures of the given natural versed sine for the purpose of finding the *difference*, and the degrees, &c., may be set down opposite to the given natural versed sine. Thus, having the natural versed sine 1304462 to find the corresponding arc.

Arc required 107° 43′ 33″. Given N. V. S. - - -	1304462
3 right-hand figures of next less N. V. S. - - -	310
Parts	152=33″

TABLE XXVI.

Time to be added to the Right Ascension of a Star, to find the Time of its passing the Meridian on any Day of the Year.

This table contains the complement, to the 24 hours, of the Sun's mean right ascension, for every day of the year, which, being added to the right ascension of any Star, the sum, rejecting 24 hours if it exceed that quantity, will show the *apparent time* when that Star passes the meridian sufficiently exact for the purpose of observing the meridian altitude, to find the latitude of the ship; or for finding any particular Star, by observing its altitude when on the meridian.

EXAMPLES.

1. At what time does *Regulus* pass the meridian on the 5th March?

	h.	m.
Right ascension of *Regulus*, N. A. p. 432 - - -	10	0
Time for the 5th of March - - - - - -	+ 0	57
Time when Regulus passes the meridian, 5th March - -	10	57
		m

2. Required the time on the 16th August, when α *Lyræ* or *Vega*, is on the meridian?

	h.	m.
Right ascension of *Vega*, N. A. p. 433 - - - -	18	31
Time for the 16th of August - - - - - -	+ 14	18
(Sum—24 hours.) Time of Vega's passing the merid. 16th Aug. -	8	49

TABLE XXVII.

Correction to be subtracted from the Observed Altitude of a Fixed Star.

This table contains the refraction in altitude combined with the dip of the horizon; each correction is given to the nearest tenth of a minute, and is always to be subtracted from the observed altitude of a Star, in order to find the true altitude.

For example: let the observed altitude of a Star be 39° 41′, when the height of the observer's eye is 18 feet above the sea: required the true altitude of the Star?

Star's observed altitude - - - -	39°	41′·0
Under 18 feet and opposite 40°, is - -	—	5·3
Star's true altitude - - - -	39	35·7

Note.—Seconds are reduced to tenths of a minute, by dividing them by 6′, and tenths of a minute are turned into seconds, when multiplied by 6.

TABLE A.

Long. °	Mean Time. Hours.	Acceleration. m. s.	Long. ° ′	Mean Time. Minutes.	Acceleration. s.	Long. ′ ″	Mean Time. Seconds.	Acceleration. s.
15	1	0 9·86	15	1	·16	15	1	·00
30	2	0 19·71	30	2	·33	30	2	·01
45	3	0 29·57	45	3	·49	45	3	·01
60	4	0 39·43	1 00	4	·66	1 00	4	·01
75	5	0 49·28	1 15	5	·82	"	5	·01
90	6	0 59·14	1 30	6	·99	1 30	6	·02
105	7	1 8·10	1 45	7	1·15	"	7	·02
120	8	1 18·85	2 00	8	1·31	2 00	8	·02
135	9	1 28·71	2 15	9	1·48	"	9	·02
150	10	1 38·56	2 30	10	1·64	2 30	10	·03
165	11	1 48·42	2 45	11	1·81	"	11	·03
180	12	1 58·28	3 00	12	1 97	3 00	12	·03
	13	2 8·13	3 15	13	2·14	"	13	·04
	14	2 17·99	3 30	14	2·30	3 30	14	·04
	15	2 27·85	3 45	15	2·46	"	15	·04
	16	2 37·70	4 00	16	2·63	4 00	16	·04
	17	2 47·56	4 15	17	2·79	"	17	·05
	18	2 57·42	4 30	18	2·96	4 30	18	·05
	19	3 7·27	4 45	19	3·12	"	19	·05
	20	3 17·13	5 00	20	3·28	5 00	20	·05
	21	3 26·98	5 15	21	3·45	"	21	·06
	22	3 36·84	5 30	22	3·61	5 30	22	·06
	23	3 46·70	5 45	23	3·78	"	23	·06
	24	3 56·55	6 00	24	3·94	6 00	24	·06
			6 15	25	4·11	"	25	·07
			6 30	26	4·27	6 30	26	·07
			6 45	27	4·43	"	27	·07
			7 00	28	4·60	7 00	28	·08
			7 15	29	4·76	"	29	·08
			7 30	30	4·93	7 30	30	·08
			7 45	31	5·09	7 45	31	·08
			8 00	32	5·26	8 00	32	·09
			8 15	33	5·42	"	33	·09
			8 30	34	5·58	8 30	34	·09
			8 45	35	5·75	"	35	·09
			9 00	36	5·91	9 00	36	·10
			9 15	37	6·08	"	37	·10
			9 30	38	6·24	9 30	38	·10
			9 45	39	6·41	"	39	·10
			10 00	40	6·57	10 00	40	·11
			10 15	41	6·73	"	41	·11
			10 30	42	6·90	10 30	42	·11
			10 45	43	7·06	"	43	·12
			11 00	44	7·23	11 00	44	·12
			11 15	45	7·39	"	45	·12
			11 30	46	7·56	11 30	46	·12
			11 45	47	7·72	"	47	·13
			12 00	48	7·88	12 00	48	·13
			12 15	49	8·05	"	49	·13
			12 30	50	8·21	12 30	50	·14
			12 45	51	8·38	"	51	·14
			13 00	52	8·54	13 00	52	·14
			13 15	53	8·71	"	53	·14
			13 30	54	8·87	13 30	54	·15
			13 45	55	9·03	"	55	·15
			14 00	56	9·20	14 00	56	·15
			14 15	57	9·36	"	57	·16
			14 30	58	9·53	14 30	58	·16
			14 45	59	9·69	"	59	·16
			15 00	60	9·86	15 00	60	·16

TABLE R.

Siderl. Hours.	R. m.	R. s.	Siderl. Minutes.	R. s.	Siderl. Minutes.	R. s.	Siderl. Seconds.	R. 10ths.	Siderl. Seconds.	R. 10ths.
1	0	9·83	1	0·16	31	5·08	1	·00	31	·09
2	0	19·66	2	0·33	32	5·24	2	·01	32	·09
3	0	29·49	3	0·49	33	5·41	3	·01	33	·09
4	0	39·32	4	0·66	34	5·57	4	·01	34	·09
5	0	49·15	5	0·82	35	5·73	5	·01	35	·10
6	0	58·98	6	0·98	36	5·90	6	·02	36	·10
7	1	8·81	7	1·15	37	6·06	7	·02	37	·10
8	1	18·64	8	1·31	38	6·23	8	·02	38	·10
9	1	28·47	9	1·47	39	6·39	9	·02	39	·11
10	1	38·30	10	1·64	40	6·55	10	·03	40	·11
11	1	48·13	11	1·80	41	6·72	11	·03	41	·11
12	1	57·96	12	1·97	42	6·88	12	·03	42	·12
13	2	7·78	13	2·13	43	7·04	13	·04	43	·12
14	2	17·61	14	2·29	44	7·21	14	·04	44	·12
15	2	27·44	15	2·46	45	7·37	15	·04	45	·12
16	2	37·27	16	2·62	46	7·54	16	·04	46	·13
17	2	47·10	17	2·78	47	7·70	17	·05	47	·13
18	2	56·93	18	2·95	48	7·86	18	·05	48	·13
19	3	6·76	19	3·11	49	8·03	19	·05	49	·13
20	3	16·59	20	3·28	50	8·19	20	·05	50	·14
21	3	26·42	21	3·44	51	8·36	21	·06	51	·14
22	3	36·25	22	3·60	52	8·52	22	·06	52	·14
23	3	46·08	23	3·77	53	8·68	23	·06	53	·14
24	3	55·91	24	3·93	54	8·85	24	·07	54	·15
			25	4·10	55	9·01	25	·07	55	·15
			26	4·26	56	9·17	26	·07	56	·15
			27	4·42	57	9·34	27	·07	57	·16
			28	4·59	58	9·50	28	·08	58	·16
			29	4·75	59	9·67	29	·08	59	·16
			30	4·91	60	9·83	30	·08	60	·16

TABLE P.

Parallax in Altitude of the Planets.

Planets Horizontal Parallax.

App. Alt.	1″	2″	3″	4″	5″	6″	7″	9″	11″	13″	15″	17″	19″	21″	23″	25″	27″	29″	30″
°	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″
10	1	2	3	4	5	6	7	9	11	13	15	17	19	21	23	25	27	29	30
15	1	2	3	4	5	6	7	9	11	13	15	17	19	21	23	25	26	28	29
20	1	2	3	4	5	6	7	9	10	12	14	16	18	20	22	24	25	27	28
25	1	2	3	4	5	5	6	8	10	12	14	15	17	19	21	23	24	26	27
30	1	2	3	3	4	5	6	8	10	11	13	15	16	18	20	22	23	25	26
33	1	2	2	3	4	5	6	8	9	11	13	14	16	18	19	21	23	24	25
36	1	2	2	3	4	5	6	7	9	11	12	14	15	17	19	20	22	23	25
39	1	2	2	3	4	5	5	7	9	10	12	13	15	16	18	19	21	23	24
42	1	1	2	3	4	4	5	7	8	10	11	13	14	16	17	19	20	22	23
45	1	1	2	3	4	4	5	6	8	9	11	12	13	15	16	18	19	21	21
48	1	1	2	3	3	4	5	6	7	9	10	11	13	14	15	17	18	19	20
51	1	1	2	2	3	4	4	6	7	8	9	11	12	13	14	16	17	18	19
54	1	1	2	2	3	3	4	5	6	8	9	10	11	12	14	15	16	17	18
57	1	1	2	2	3	3	4	5	6	7	8	9	10	11	12	14	15	16	17
60	0	1	2	2	3	3	4	5	6	7	8	9	10	11	12	13	14	15	15
62	0	1	1	2	2	3	3	4	5	6	7	8	10	10	11	12	13	14	14
64	0	1	1	2	2	3	3	4	5	6	7	8	9	10	10	11	12	13	13
66	0	1	1	2	2	2	3	4	4	5	6	7	8	9	9	10	11	12	12
68	0	1	1	2	2	2	3	3	4	5	5	6	7	8	9	9	10	11	11
70	0	1	1	1	2	2	2	3	4	5	5	6	7	7	8	9	9	10	10
72	0	0	1	1	2	2	2	3	3	4	5	5	6	6	7	8	8	9	9
74	0	0	1	1	1	2	2	2	3	3	4	5	5	5	7	7	7	8	8
76	0	0	1	1	1	2	2	2	3	3	4	4	5	5	6	6	7	7	7
78	0	0	1	1	1	1	1	2	2	3	3	4	4	4	5	5	6	6	6
81	0	0	0	1	1	1	1	1	2	2	2	3	3	3	4	4	4	5	5
84	0	0	0	0	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3
87	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	2	2
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE I.

To turn Degrees into Time, or, Time into Degrees.

Degrees.	Time. H. M.	Degrees.	Time. H. M.	Degrees.	Time. H. M.	Minutes of Degrees.	Time. M. S.	Seconds of Degrees.	Time. S. T.
1	0. 4	61	4. 4	121	8. 4	1	0. 4	1	0. 4
2	0. 8	62	4. 8	122	8. 8	2	0. 8	2	0. 8
3	0.12	63	4.12	123	8.12	3	0.12	3	0.12
4	0.16	64	4.16	124	8.16	4	0.16	4	0.16
5	0.20	65	4.20	125	8.20	5	0.20	5	0.20
6	0.24	66	4.24	126	8.24	6	0.24	6	0.24
7	0.28	67	4.28	127	8.28	7	0.28	7	0.28
8	0.32	68	4.32	128	8.32	8	0.32	8	0.32
9	0.36	69	4.36	129	8.36	9	0.36	9	0.36
10	0.40	70	4.40	130	8.40	10	0.40	10	0.40
11	0.44	71	4.44	131	8.44	11	0.44	11	0.44
12	0.48	72	4.48	132	8.48	12	0.48	12	0.48
13	0.52	73	4.52	133	8.52	13	0.52	13	0.52
14	0.56	74	4.56	134	8.56	14	0.56	14	0.56
15	1. 0	75	5. 0	135	9. 0	15	1. 0	15	1. 0
16	1. 4	76	5. 4	136	9. 4	16	1. 4	16	1. 4
17	1. 8	77	5. 8	137	9. 8	17	1. 8	17	1. 8
18	1.12	78	5.12	138	9.12	18	1.12	18	1.12
19	1.16	79	5.16	139	9.16	19	1.16	19	1.16
20	1.20	80	5.20	140	9.20	20	1.20	20	1.20
21	1.24	81	5.24	141	9.24	21	1.24	21	1.24
22	1.28	82	5.28	142	9.28	22	1.28	22	1.28
23	1.32	83	5.32	143	9.32	23	1 32	23	1.32
24	1.36	84	5.36	144	9.36	24	1.36	24	1.36
25	1.40	85	5.40	145	9.40	25	1.40	25	1.40
26	1.44	86	5.44	146	9.44	26	1.44	26	1.44
27	1.48	87	5.48	147	9.48	27	1.48	27	1.48
28	1.52	88	5.52	148	9.52	28	1.52	28	1.52
29	1.56	89	5.56	149	9.56	29	1.56	29	1.56
30	2. 0	90	6. 0	150	10. 0	30	2. 0	30	2. 0
31	2. 4	91	6. 4	151	10. 4	31	2. 4	31	2. 4
32	2. 8	92	6. 8	152	10. 8	32	2. 8	32	2. 8
33	2.12	93	6.12	153	10.12	33	2.12	33	2.12
34	2.16	94	6.16	154	10.16	34	2.16	34	2.16
35	2.20	95	6.20	155	10.20	35	2.20	35	2.20
36	2.24	96	6.24	156	10.24	36	2.24	36	2.24
37	2.28	97	6.28	157	10.28	37	2.28	37	2.28
38	2.32	98	6.32	158	10.32	38	2.32	38	2.32
39	2.36	99	6.36	159	10.36	39	2.36	39	2.36
40	2.40	100	6.40	160	10.40	40	2.40	40	2.40
41	2.44	101	6.44	161	10.44	41	2.44	41	2.44
42	2 48	102	6.48	162	10.48	42	2.48	42	2.48
43	2 52	103	6.52	163	10.52	43	2.52	43	2.52
44	2 56	104	6.56	164	10.56	44	2.56	44	2.56
45	3. 0	105	7. 0	165	11. 0	45	3. 0	45	3. 0
46	3. 4	106	7. 4	166	11. 4	46	3. 4	46	3. 4
47	3. 8	107	7. 8	167	11. 8	47	3. 8	47	3. 8
48	3.12	108	7.12	168	11.12	48	3.12	48	3.12
49	3.16	109	7.16	169	11.16	49	3.16	49	3.16
50	3.20	110	7.20	170	11.20	50	3.20	50	3.20
51	3.24	111	7.24	171	11.24	51	3.24	51	3.24
52	3.28	112	7.28	172	11.28	52	3.28	52	3.28
53	3.32	113	7.32	173	11.32	53	3.32	53	3.32
54	3.36	114	7.36	174	11.36	54	3.36	54	3.36
55	3.40	115	7.40	175	11.40	55	3.40	55	3.40
56	3.44	116	7.44	176	11.44	56	3.44	56	3.44
57	3.48	117	7.48	177	11.48	57	3.48	57	3.48
58	3.52	118	7.52	178	11.52	58	3.52	58	3.52
59	3.56	119	7.56	179	11.56	59	3.56	59	3.56
60	4. 0	120	8. 0	180	12. 0	60	4. 0	60	4. 0

TABLE II.

Dip of the Horizon.

Height in Feet.	Dip.	Height in Feet.	Dip.	Height in Feet.	Dip.
	′ ″		′ ″		′ ″
1	0.58	28	5.10	125	10.56
2	1.22	30	5.21	130	11. 9
3	1.40	32	5.31	135	11.22
4	1.55	34	5.40	140	11.35
5	2. 9	36	5.50	145	11 47
6	2.22	38	6. 0	150	11.59
7	2.33	40	6.10	155	12.11
8	2.44	42	6.19	160	12.23
9	2.54	44	6.28	165	12.34
10	3. 3	46	6.37	170	12.45
11	3.12	48	6.45	175	12.56
12	3.21	50	6.53	180	13. 7
13	3.29	55	7.11	185	13.18
14	3.37	60	7.29	190	13.29
15	3.45	65	7.47	195	13.40
16	3.53	70	8. 5	200	13.50
17	4. 1	75	8.23	210	14 10
18	4. 8	80	8.40	220	14.30
19	4.15	85	8.57	230	14.50
20	4.22	90	9.14	240	15. 9
21	4 28	95	9.30	250	15.27
22	4.34	100	9.46	260	15.44
23	4.40	105	10. 1	270	16. 0
24	4.46	110	10.16	280	16.16
25	4 52	115	10.30	290	16.31
26	4.58	120	10.43	300	16.46

TABLE III.

Dip of the Horizon—at different distances from the Observer.

Distance of Land in Miles.	HEIGHT OF THE EYE IN FEET.									
	5	10	15	20	25	30	35	40	45	50
	′	′	′	′	′	′	′	′	′	′
0.1	28	56	84	112	140	169	197	225	252	280
0.2	14	28	42	56	70	85	99	113	126	140
0.3	9	19	28	37	47	56	65	75	84	93
0.4	7	14	21	28	35	42	49	56	63	70
0.5	6	11	17	22	28	34	39	45	50	56
0 6	5	9	14	19	23	28	33	37	42	47
0.7	4	8	12	16	20	24	28	32	36	40
0.8	4	7	10	14	17	21	25	28	31	35
0.9	3	6	9	12	15	19	22	25	28	31
1.0	3	6	8	11	14	17	20	23	25	27
1.2	3	5	7	9	12	14	16	19	21	23
1.4	3	4	6	8	10	12	14	16	18	20
1.6	3	4	5	7	9	11	13	14	16	18
1.8	2	3	5	6	8	10	12	13	14	16
2.0	2	3	5	6	7	9	11	12	13	15
2.2	2	3	5	6	7	8	10	11	12	14
2.4	2	3	5	6	7	8	9	11	12	13
2.6	2	3	4	5	6	8	9	10	11	12
2.8	2	3	4	5	6	7	8	9	10	11
3.0	2	3	4	5	6	7	8	8	9	10
3.5	2	3	4	5	6	6	7	8	9	9
4.0	2	3	4	4	5	6	7	7	8	8
4.5	2	3	4	4	5	5	6	6	7	8
5.0	2	3	4	4	5	5	6	6	7	7
6.0	2	3	4	4	5	5	6	6	7	7
7.0	2	3	4	4	5	5	6	6	7	7

TABLE IV.

Moon's Augmentation.

☽'s App. Alt.	☽'s SEMIDIAMETER BY THE NAUTICAL ALMANAC.						
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
	14.40	15. 0	15.20	15.40	16. 0	16.20	16.40
°	″	″	″	″	″	″	″
0	0	0	0	0	0	0	0
3	1	1	1	1	1	1	1
6	2	2	2	2	2	2	2
9	2	2	3	3	3	3	3
12	3	3	3	3	4	4	4
15	4	4	4	4	4	5	5
18	4	5	5	5	5	5	6
21	5	5	6	6	6	6	7
24	6	6	6	7	7	7	7
27	6	7	7	7	8	8	8
30	7	7	8	8	8	9	9
33	8	8	8	8	9	9	10
36	8	8	9	9	10	10	11
39	9	9	10	10	11	11	11
42	9	10	10	11	11	12	12
45	10	10	11	11	12	12	13
48	10	11	11	12	12	13	13
51	11	12	12	12	13	13	14
54	11	12	12	13	13	14	14
57	12	13	13	13	14	14	15
60	12	13	13	14	14	15	16
65	13	14	14	15	15	16	16
70	13	14	14	15	16	16	17
75	14	14	15	15	16	16	17
80	14	14	15	16	16	17	18
90	14	15	15	16	17	17	18

TABLE V.

Contraction of Semidiameter of ☉ or ☽.

Apparent Altitude.	ANGLE WITH THE HORIZON.											
	° 0	° 12	° 24	° 36	° 48	° 54	° 60	° 66	° 72	° 78	° 84	° 90
° ′	″	″	″	″	″	″	″	″	″	″	″	″
5. 0	0	1	4	9	14	16	19	21	23	24	25	25
5.20	0	1	4	8	12	14	17	19	21	22	23	23
5.40	0	1	3	8	11	13	15	17	19	20	21	21
6. 0	0	1	3	7	10	12	14	16	17	18	19	19
6.20	0	1	3	6	9	11	13	14	15	16	17	17
6.40	0	1	2	5	8	10	12	13	14	15	15	15
7. 0	0	1	2	5	8	9	11	12	13	14	14	14
7.20	0	1	2	5	7	8	10	11	12	13	13	13
7.40	0	0	2	4	6	8	9	10	11	12	12	12
8. 0	0	0	2	4	6	7	8	9	10	11	11	11
8.30	0	0	2	4	5	6	7	8	9	10	10	10
9. 0	0	0	1	3	5	6	7	7	8	9	9	9
10. 0	0	0	1	3	4	5	6	6	7	7	8	8
11. 0	0	0	1	3	4	5	5	5	6	6	6	6
12. 0	0	0	1	2	3	4	4	5	5	5	5	5
13. 0	0	0	1	2	3	4	4	4	4	4	4	4
14. 0	0	0	1	1	2	3	3	3	4	4	4	4
15. 0	0	0	1	1	2	2	3	3	3	3	3	3
16. 0	0	0	1	1	2	2	2	3	3	3	3	3
18. 0	0	0	0	1	1	1	2	2	2	2	3	3
20. 0	0	0	0	1	1	1	2	2	2	2	2	2
30. 0	0	0	0	0	1	1	1	1	1	1	1	1
40. 0	0	0	0	0	0	0	0	0	1	1	1	1
50. 0	0	0	0	0	0	0	0	0	0	0	0	0
70. 0	0	0	0	0	0	0	0	0	0	0	0	0
90. 0	0	0	0	0	0	0	0	0	0	0	0	0

Corrections of the Apparent Altitudes of the Sun and Stars.

Alt.	⊙'s Corr.	*'s Corr.	Diff. to 10′	Alt.	⊙'s Corr.	*'s Corr.	Alt.	⊙'s Corr.	*'s Corr.	Alt.	⊙'s Corr.	*'s Corr.	Alt.	⊙'s Corr.	*'s Corr.
° ′	′ ″	′ ″	″	° ′	′ ″	′ ″	° ′	′ ″	′ ″	° ′	′ ″	′ ″	° ′	′ ″	′ ″
0. 0	32 51	33. 0	98	10. 0	5. 6	5.15	20. 0	2.28	2.36	30. 0	1.31	1.39	50. 0	0.42	0.48
10	31.13	31.22	92	10	5. 1	5.10	10	2.27	2.35	20	1.29	1.37	30	.42	.47
20	29.41	29.50	87	20	4.56	5. 5	20	2.25	2.33	40	1.28	1.36	51. 0	.41	.46
30	28.14	28.23	83	30	4.51	5. 0	30	2.24	2.32	31. 0	1.27	1.35	30	.40	.46
40	26.51	27. 0	78	40	4.47	4.56	40	2.22	2.30	20	1.26	1.33	52. 0	.39	.45
50	25.33	25.42	73	50	4.42	4.51	50	2.21	2.29	40	1.25	1.32	30	.39	.44
1. 0	24.20	24.29	69	11. 0	4.38	4.47	21. 0	2.19	2.27	32. 0	1.24	1.31	53. 0	.38	.43
10	23.11	23.20	65	10	4.34	4.43	10	2.18	2.26	20	1.23	1.30	30	.37	.42
20	22. 6	22.15	61	20	4.30	4.39	20	2.17	2.25	40	1.22	1.29	54. 0	.36	.41
30	21. 5	21.14	56	30	4.26	4.35	30	2.15	2.23	33. 0	1.21	1.28	30	.36	.41
40	20. 9	20.18	53	40	4.22	4.31	40	2.14	2.22	20	1.19	1.26	55. 0	.35	.40
50	19.16	19.25	50	50	4.18	4.27	50	2.13	2.21	40	1.18	1.25	30	.34	.39
2. 0	18.26	18.35	47	12. 0	4.14	4.23	22. 0	2.12	2.20	34. 0	1.17	1.24	56. 0	.33	.38
10	17.39	17.48	44	10	4.11	4.20	10	2.11	2.19	20	1.16	1.23	30	.33	.38
20	16.55	17. 4	41	20	4. 7	4.16	20	2.10	2.18	40	1.15	1.22	57. 0	.32	.37
30	16.14	16.23	38	30	4. 4	4.13	30	2. 9	2.17	35. 0	1.14	1.21	30	.32	.37
40	15.36	15.45	36	40	4. 1	4.10	40	2. 8	2.16	20	1.13	1.20	58. 0	.31	.36
50	15. 0	15. 9	34	50	3.57	4. 6	50	2. 7	2.15	40	1.12	1.19	30	.31	.35
3. 0	14.27	14.36	32	13. 0	3.54	4. 3	23. 0	2. 6	2.14	36. 0	1.11	1.18	59. 0	.30	.34
10	13.55	14. 4	30	10	3.51	4. 0	10	2. 5	2.13	20	1.10	1.17	30	.30	.34
20	13.25	13.34	28	20	3.48	3.57	20	2. 4	2.12	40	1.10	1.17	60. 0	.29	.33
30	12.57	13. 6	27	30	3.45	3.54	30	2. 3	2.11	37. 0	1. 9	1.16	30	.28	.33
40	12.30	12.39	25	40	3.42	3.51	40	2. 2	2.10	20	1. 8	1.15	61. 0	.27	.32
50	12. 5	12.14	24	50	3.39	3.48	50	2. 1	2. 9	40	1. 7	1.14	30	.27	.31
4. 0	11.41	11.50	22	14. 0	3.37	3.46	24. 0	2. 0	2. 8	38. 0	1. 6	1.13	62. 0	.26	.30
10	11.19	11.28	21	10	3.34	3.43	10	1.59	2. 7	20	1. 5	1.12	30	.26	.30
20	10.58	11. 7	20	20	3.31	3.40	20	1.58	2. 6	40	1. 4	1.11	63. 0	.25	.29
30	10.38	10.47	19	30	3.29	3.38	30	1.57	2. 5	39. 0	1. 3	1.10	30	.25	.29
40	10.19	10.28	18	40	3.26	3.35	40	1.56	2. 4	20	1. 2	1. 9	64. 0	.24	.28
50	10. 1	10.10	17	50	3.24	3.33	50	1.55	2. 3	40	1. 1	1. 8	30	.24	.28
5. 0	9.44	9.53	16	15. 0	3.21	3.30	25. 0	1.54	2. 2	40. 0	1. 1	1. 8	65. 0	.23	.27
10	9.28	9.37	15	10	3.19	3.28	10	1.53	2. 1	20	1. 0	1. 7	30	.23	.26
20	9.13	9.22	15	20	3.17	3.26	20	1.52	2. 0	40	1. 0	1. 6	66. 0	.22	.25
30	8.58	9. 7	14	30	3.15	3.24	30	1.51	1.59	41. 0	.59	1. 5	30	.22	.25
40	8.44	8.53	13	40	3.12	3.21	40	1.50	1.58	20	.58	1. 4	67. 0	.21	.24
50	8.31	8.40	13	50	3.10	3.19	50	1.49	1.57	40	.57	1. 3	30	.21	.24
6. 0	8.18	8.27	12	16. 0	3. 8	3.17	26. 0	1.48	1.56	42. 0	.57	1. 3	68. 0	.20	.23
10	8. 6	8.15	12	10	3. 6	3.15	10	1.47	1.55	20	.56	1. 2	30	.20	.23
20	7.54	8. 3	11	20	3. 4	3.13	20	1.46	1.54	40	.56	1. 1	69. 0	.19	.22
30	7.43	7.52	11	30	3. 2	3.11	30	1.45	1.53	43. 0	.55	1. 1	70. 0	.18	.21
40	7.32	7.41	10	40	3. 0	3. 9	40	1.45	1.53	20	.55	1. 0	71. 0	.17	.20
50	7.22	7.31	10	50	2.58	3. 7	50	1.44	1.52	40	.54	1. 0	72. 0	.16	.19
7. 0	7.12	7.21	9	17. 0	2.56	3. 5	27. 0	1.43	1.51	44. 0	.53	.59	73. 0	.15	.17
10	7. 3	7.12	9	10	2.54	3. 3	10	1.42	1.50	20	.53	.58	74. 0	.14	.16
20	6.54	7. 3	9	20	2.52	3. 1	20	1.42	1.50	40	.52	.58	75. 0	.13	.15
30	6.45	6.54	8	30	2.50	2.59	30	1.41	1.49	45. 0	.51	.57	76. 0	.12	.14
40	6.37	6.46	8	40	2.49	2.58	40	1.41	1.49	20	.51	.57	77. 0	.11	.13
50	6.29	6.38	8	50	2.47	2.56	50	1.40	1.48	40	.50	.56	78. 0	.10	.12
8. 0	6.21	6.30	8	18. 0	2.45	2.54	28. 0	1.39	1.47	46. 0	.49	.55	79. 0	. 9	.11
10	6.13	6.22	7	10	2.43	2.52	10	1.38	1.46	20	.49	.55	80. 0	. 8	.10
20	6. 6	6.15	7	20	2.42	2.51	20	1.38	1.46	40	.48	.54	81. 0	. 8	. 9
30	5.59	6. 8	7	30	2.40	2.49	30	1.37	1.45	47. 0	.47	.53	82. 0	. 7	. 8
40	5.52	6. 1	6	40	2.38	2.47	40	1.37	1.45	20	.47	.53	83. 0	. 6	. 7
50	5.46	5.55	6	50	2.37	2.46	50	1.36	1.44	40	.46	.52	84. 0	. 5	. 6
9. 0	5.40	5.49	6	19. 0	2.36	2.44	29. 0	1.35	1.43	48. 0	.45	.51	85. 0	. 4	. 5
10	5.34	5.43	6	10	2.35	2.43	10	1.34	1.42	20	.45	.51	86. 0	. 3	. 4
20	5.28	5.37	6	20	2.33	2.41	20	1.34	1.42	40	.44	.50	87. 0	. 3	. 3
30	5.22	5.31	5	30	2.32	2.40	30	1.33	1.41	49. 0	.44	.50	88. 0	. 2	. 2
40	5.17	5.26	5	40	2.31	2.39	40	1.32	1.40	20	.43	.49	89. 0	. 1	. 1
50	5.12	5.21		50	2.29	2.37	50	1.32	1.40	40	.43	.49	90. 0	. 0	. 0

TABLE VII.

To Correct the Mean Refraction.

App. Alt.	Height of the Thermometer.																App. Alt.
	° 20	° 24	° 28	° 32	° 36	° 40	° 44	° 48	° 50	° 52	° 56	° 60	° 64	° 68	° 72	° 76	° 80	
°	′+″	′+″	′+″	′+″	′+″	′+″	′+″	′+″	′ ″	′−″	′−″	′−″	′−″	′−″	′−″	′−″	′−″	°
2	1 31	1 18	1. 5	53	41	29	17	6	0	5	16	27	37	48	58	1. 8	1.18	2
3	1 11	1 1	51	41	32	22	13	4	0	4	13	21	30	38	46	54	1. 1	3
4	58	49	41	33	26	18	11	4	0	4	11	17	24	31	37	44	50	4
5	48	41	35	28	22	16	9	3	0	3	9	14	20	26	31	36	41	5
6	41	35	30	24	19	14	8	3	0	2	7	12	17	22	26	31	35	6
7	36	31	26	21	17	12	7	2	0	2	6	10	15	19	23	27	31	7
8	32	27	23	19	15	10	6	2	0	2	5	9	13	16	20	24	27	8
9	29	24	20	17	13	9	5	2	0	2	5	8	11	14	18	21	24	9
10	26	22	18	15	12	8	5	2	0	1	4	7	10	13	16	19	22	10
11	23	20	17	14	11	8	5	2	0	1	4	7	9	12	15	18	20	11
12	21	18	15	13	10	7	4	1	0	1	4	6	8	11	13	16	18	12
14	18	16	13	11	8	6	4	1	0	1	3	5	7	9	11	14	16	14
16	16	14	12	9	7	5	3	1	0	1	3	5	6	8	10	12	14	16
18	14	12	10	8	6	5	3	1	0	1	2	4	6	7	9	10	12	18
20	13	11	9	7	6	4	2	1	0	1	2	4	5	6	8	9	11	20
22	11	10	8	7	5	4	2	1	0	1	2	3	5	6	7	8	10	22
26	9	8	7	6	4	3	2	1	0	1	2	3	4	5	6	7	8	26
30	8	7	6	5	4	3	2	1	0	0	1	2	3	4	5	6	7	30
35	7	6	5	4	3	2	1	0	0	0	1	2	3	3	4	5	6	35
40	6	5	4	3	3	2	1	0	0	0	1	2	2	3	3	4	5	40
50	4	3	3	2	2	1	1	0	0	0	1	1	2	2	2	3	3	50
60	3	2	2	2	1	1	1	0	0	0	0	1	1	1	2	2	2	60
70	2	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	70
80	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	80
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90
App. Alt.				− 28.26	− 28.56	− 28.85	− 29.15	− 29.45	29.60	+ 29.75	+ 30.05	+ 30.35	+ 30.64	+ 30.93				App. Alt.
	Height of the Barometer.																	

TABLE VIII.

Correction of the Moon's Semidiameter, or Horizontal Parallax, for any given Time between Noon and Midnight, or of the Sun's Declination for a given Time from the preceding Noon.

Time after Noon or Midnight.	Variation of the)'s Semidiameter or Horizontal Parallax in 12 Hours.																									Time past Noon.
	″ 1	″ 2	′ 3	″ 4	″ 5	″ 6	″ 7	″ 8	″ 9	″ 10	″ 11	″ 12	″ 13	″ 14	″ 15	″ 16	″ 17	″ 18	″ 19	″ 20	″ 21	″ 22	″ 23	″ 24	″ 25	″ 26	″ 27	″ 28	
h. m.																													h.
0 30	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1 0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2
1 30	0	0	0	0	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3
2 0	0	0	0	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	3	3	4	4	4	4	4	4	4	5	4
2 30	0	0	1	1	1	1	1	2	2	2	2	2	3	3	3	3	4	4	4	4	4	5	5	5	5	5	5	6	5
3 0	0	0	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	5	6	6	6	6	7	7	6
3 30	0	1	1	1	1	2	2	2	3	3	3	3	4	4	4	5	5	5	6	6	6	6	7	7	7	8	8	8	7
4 0	0	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	8
4 30	0	1	1	1	2	2	3	3	3	4	4	4	5	5	6	6	6	7	7	7	8	8	9	9	9	10	10	10	9
5 0	0	1	1	2	2	2	3	3	4	4	5	5	5	6	6	7	7	7	8	8	9	9	10	10	10	11	11	12	10
5 30	0	1	1	2	2	3	3	4	4	5	5	5	6	6	7	7	8	8	9	9	10	10	11	11	11	12	12	13	11
6 0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	12
6 30	1	1	2	2	3	3	4	4	5	5	6	6	7	8	8	9	9	10	10	11	11	12	12	13	14	14	15	15	13
7 0	1	1	2	2	3	3	4	5	5	6	6	7	8	8	9	9	10	10	11	12	12	13	13	14	15	15	16	16	14
7 30	1	1	2	2	3	4	4	5	6	6	7	7	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	17	15
8 0	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	11	11	12	13	13	14	15	15	16	17	17	18	19	16
8 30	1	1	2	3	4	4	5	6	6	7	8	8	9	10	11	11	12	13	13	14	15	16	16	17	18	18	19	20	17
9 0	1	1	2	3	4	4	5	6	7	7	8	9	10	10	11	12	13	13	14	15	16	16	17	18	19	19	20	21	18
9 30	1	2	2	3	4	5	6	6	7	8	9	9	10	11	12	13	13	14	15	16	17	17	18	19	20	21	21	22	19
10 0	1	2	2	3	4	5	6	7	7	8	9	10	11	12	12	13	14	15	16	17	17	18	19	20	21	22	22	23	20
10 30	1	2	3	3	4	5	6	7	8	9	10	10	11	12	13	14	15	16	17	17	18	19	20	21	22	23	24	24	21
11 0	1	2	3	4	5	5	6	7	8	9	10	11	12	13	14	15	16	16	17	18	19	20	21	22	23	24	25	26	22
11 30	1	2	3	4	5	6	7	8	9	10	11	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	23
12 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	24
Time after Noon or Midnight.	′ 1	′ 2	′ 3	′ 4	′ 5	′ 6	′ 7	′ 8	′ 9	′ 10	′ 11	′ 12	′ 13	′ 14	′ 15	′ 16	′ 17	′ 18	′ 19	′ 20	′ 21	′ 22	′ 23	′ 24	′ 25	′ 26	′ 27	′ 28	Time past Noon.
	Variation of the ⊙'s Declination in 24 Hours.																												

Altitudes by which the Apparent Time or Horary Angle may be found with the greatest Accuracy.

Lat.	DECLINATION OF THE OBJECT, OF THE SAME NAME AS THE LATITUDE																			Lat.
	° 2	° 4	° 6	° 8	° 10	° 12	° 14	° 16	° 18	° 20	° 22	° 24	° 26	° 28	° 30	° 32	° 34	° 36	° 38	° 40	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	30	14	10	7	6	5	4	4	3	3	3	2	2	2	2	2	2	2	2	2	1
2	90	30	19	15	12	10	8	7	6	6	5	5	5	4	4	4	4	3	3	3	2
3	42	49	30	22	18	15	12	11	10	9	8	7	7	6	6	6	5	5	5	5	3
4	30	90	42	30	24	20	17	15	13	12	11	10	9	9	8	8	7	7	7	6	4
5	24	53	56	39	30	25	21	18	16	15	13	12	11	11	10	9	9	9	8	8	5
6	20	42	90	49	37	30	26	22	20	18	16	15	14	13	12	11	11	10	10	9	6
7	17	35	59	61	45	36	30	26	23	21	19	17	16	15	14	13	13	12	11	11	7
8	15	30	49	90	53	42	35	30	27	24	22	20	19	17	16	15	14	14	13	13	8
9	12	26	42	63	64	49	40	34	30	27	25	23	21	20	18	17	16	15	15	14	9
10	11	24	37	53	90	57	46	39	34	30	28	25	23	22	20	19	18	17	16	16	10
11	10	22	33	47	66	67	52	44	38	34	31	28	26	24	22	21	20	19	18	17	11
12	10	20	30	42	59	90	59	49	42	37	34	31	28	26	25	23	22	21	20	19	12
13	9	18	28	38	51	68	68	55	47	41	37	34	31	29	27	25	24	23	21	20	13
14	8	17	26	35	46	59	90	61	52	45	40	37	33	31	29	27	26	24	23	22	14
15	8	16	24	33	42	53	69	70	57	49	44	40	36	34	31	29	28	26	25	24	15
16	7	15	22	30	39	49	61	90	63	54	47	43	39	36	33	31	30	28	27	25	16
17	7	14	21	28	36	45	56	71	71	59	51	46	42	39	36	34	32	30	28	27	17
18	6	13	20	27	34	42	52	63	90	65	56	49	45	41	38	36	34	32	30	29	18
19	6	12	19	25	32	40	48	58	72	72	60	53	48	44	41	38	36	34	32	30	19
20	6	12	18	24	31	37	45	54	65	90	66	57	51	47	43	40	38	36	34	32	20
21	6	11	17	23	29	35	42	50	60	73	73	62	55	50	46	43	40	38	36	34	21
22	5	11	16	22	28	34	40	47	56	66	90	67	59	53	49	45	42	40	38	36	22
23	5	10	16	21	26	32	38	45	52	61	73	74	63	57	51	48	44	42	39	37	23
24	5	10	15	20	25	31	36	43	49	57	67	90	68	60	54	50	47	44	41	39	24
25	5	9	14	19	24	29	35	41	47	54	62	74	75	64	58	53	49	46	43	41	25
26	5	9	14	19	23	28	33	39	45	51	59	68	90	69	61	56	52	48	45	43	26
27	4	9	13	18	22	27	32	37	43	49	56	64	75	76	65	59	54	51	48	45	27
28	4	9	13	17	22	26	31	36	41	47	53	60	69	90	70	62	57	53	50	47	28
29	4	8	12	17	21	25	30	35	40	45	51	57	65	76	76	66	60	56	52	49	29
30	4	8	12	16	20	25	29	34	38	43	49	54	61	70	90	71	64	58	54	51	30
31	4	8	12	16	20	24	28	33	37	42	47	52	58	66	76	77	67	61	57	53	31
32	4	8	11	15	19	23	27	32	36	40	45	50	56	62	71	90	71	64	60	56	32
33	4	7	11	15	19	22	26	31	35	39	43	48	54	60	67	77	77	68	62	58	33
34	4	7	11	14	18	22	26	30	34	38	42	47	52	57	63	72	90	72	65	61	34
35	3	7	10	14	18	21	25	29	33	37	41	45	50	55	61	68	77	78	69	63	35
36	3	7	10	14	17	21	24	28	32	36	40	44	48	53	58	65	72	90	73	66	36
37	3	7	10	13	17	20	24	27	31	35	39	43	47	51	56	62	68	78	78	70	37
38	3	7	10	13	16	20	23	27	30	34	38	41	45	50	54	59	65	73	90	74	38
39	3	6	10	13	16	19	23	26	29	33	37	40	44	48	53	57	62	69	78	78	39
40	3	6	9	12	16	19	22	25	29	32	36	39	43	47	51	55	60	66	73	90	40
42	3	6	9	12	15	18	21	24	28	31	34	37	41	45	48	52	57	62	67	74	42
44	3	6	9	12	15	17	20	23	26	29	33	36	39	43	46	50	54	58	62	68	44
46	3	6	8	11	14	17	20	23	25	28	31	34	38	41	44	48	51	55	59	63	46
48	3	5	8	11	14	16	19	22	24	27	30	33	36	39	42	46	49	52	56	60	48
50	3	5	8	10	13	16	18	21	24	27	29	32	35	38	41	44	47	50	54	57	50
52	3	5	8	10	13	15	18	20	23	26	28	31	34	37	39	42	45	48	51	55	52
54	2	5	7	10	12	15	17	20	22	25	28	30	33	36	38	41	43	46	49	53	54
56	2	5	7	10	12	15	17	19	22	24	27	29	32	35	37	40	42	45	48	51	56
58	2	5	7	9	12	14	17	19	21	24	26	29	31	34	36	39	41	44	47	49	58
60	2	5	7	9	12	14	16	19	21	23	26	28	30	33	35	38	40	43	45	48	60
62	2	5	7	9	11	14	16	18	20	23	25	27	30	32	35	37	39	42	44	47	62
64	2	4	7	9	11	13	16	18	20	22	25	27	29	31	34	36	39	41	43	46	64
66	2	4	7	9	11	13	15	18	20	22	24	26	29	31	33	35	38	40	42	45	66
68	2	4	6	9	11	13	15	17	19	22	24	26	28	30	33	35	37	39	42	44	68
70	2	4	6	9	11	13	15	17	19	21	23	26	28	30	32	34	36	39	41	43	70
72	2	4	6	8	11	13	15	17	19	21	23	25	28	30	32	34	35	38	40	42	72
74	2	4	6	8	10	12	15	17	19	21	23	25	27	29	31	33	35	38	40	42	74
76	2	4	6	8	10	12	14	16	19	21	23	25	27	29	31	33	35	37	39	42	76
80	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	35	37	39	41	80
	° 2	° 4	° 6	° 8	° 10	° 12	° 14	° 16	° 18	° 20	° 22	° 24	° 26	° 28	° 30	° 32	° 34	° 36	° 38	° 40	

TABLE X.

Logarithms for finding the Correction of the Sun's Declination, &c.

Min. or Sec.	HOURS, DEGREES, OR MINUTES.												Min. or Sec.
	0	1	2	3	4	5	6	7	8	9	10	11	
0		1.3802	1.0792	0.9031	0.7781	0.6812	0.6021	0.5351	0.4771	0.4260	0.3802	0.3388	0
1	3.1584	1.3730	0756	9007	7763	6798	6009	5341	4762	4252	3794	3382	1
2	2.8573	1.3660	0720	8983	7745	6784	5997	5330	4753	4244	3787	3375	2
3	2.6812	1.3591	0685	8959	7728	6769	5985	5320	4744	4236	3780	3368	3
4	2.5563	1.3522	0649	8935	7710	6755	5973	5310	4735	4228	3773	3362	4
5	2.4594	1.3454	1.0614	0.8912	0.7692	0.6741	0.5961	0.5300	0.4726	0.4220	0.3766	0.3355	5
6	2.3802	1.3388	0580	8888	7674	6726	5949	5289	4717	4212	3759	3349	6
7	2.3133	1.3323	0546	8865	7657	6712	5937	5279	4708	4204	3752	3342	7
8	2.2554	1.3259	0512	8842	7639	6698	5925	5269	4699	4196	3745	3336	8
9	2.2041	1.3196	0478	8819	7622	6684	5913	5259	4690	4188	3737	3329	9
10	2.1584	1.3133	1.0444	0.8796	0.7604	0.6670	0.5902	0.5249	0.4682	0.4180	0.3730	0.3323	10
11	2.1170	1.3071	0411	8773	7587	6656	5890	5239	4673	4172	3723	3316	11
12	2.0792	1.3010	0378	8751	7570	6642	5878	5229	4664	4164	3716	3310	12
13	2.0444	1.2950	0345	8728	7552	6628	5866	5219	4655	4156	3709	3303	13
14	2.0122	1.2891	0313	8706	7535	6614	5855	5209	4646	4148	3702	3297	14
15	1.9823	1.2833	1.0280	0.8683	0.7518	0.6600	0.5843	0.5199	0.4638	0.4141	0.3695	0.3291	15
16	1.9542	1.2775	0248	8661	7501	6587	5832	5189	4629	4133	3688	3284	16
17	1.9280	1.2719	0216	8639	7484	6573	5821	5179	4620	4125	3681	3278	17
18	1.9031	1.2663	0185	8617	7467	6559	5809	5169	4611	4117	3674	3271	18
19	1.8796	1.2607	0153	8595	7451	6546	5797	5159	4603	4109	3667	3265	19
20	1.8573	1.2553	1.0122	0.8573	0.7434	0.6532	0.5786	0.5149	0.4594	0.4102	0.3660	0.3258	20
21	1.8361	1.2498	0091	8552	7417	6518	5774	5139	4585	4094	3653	3252	21
22	1.8159	1.2445	0061	8530	7401	6505	5763	5129	4577	4086	3646	3246	22
23	1.7966	1.2393	0030	8509	7384	6492	5752	5120	4568	4079	3639	3239	23
24	1.7782	1.2340	1.0000	8487	7368	6478	5740	5110	4559	4071	3632	3233	24
25	1.7604	1.2289	0.9970	0.8466	0.7351	0.6465	0.5729	0.5100	0.4551	0.4063	0.3625	0.3227	25
26	1.7434	1.2239	9940	8445	7335	6451	5718	5090	4542	4055	3618	3220	26
27	1.7270	1.2188	9910	8424	7318	6438	5706	5081	4534	4048	3611	3214	27
28	1.7112	1.2139	9881	8403	7302	6425	5695	5071	4525	4040	3604	3208	28
29	1.6960	1.2090	9852	8382	7286	6412	5684	5061	4516	4032	3597	3201	29
30	1.6812	1.2041	0.9823	0.8361	0.7270	0.6398	0.5673	0.5051	0.4508	0.4025	0.3590	0.3195	30
31	1.6670	1.1993	9794	8341	7254	6385	5662	5042	4499	4017	3583	3189	31
32	1.6532	1.1946	9765	8320	7238	6372	5651	5032	4491	4010	3576	3183	32
33	1.6398	1.1899	9737	8300	7222	6359	5640	5023	4482	4002	3570	3176	33
34	1.6269	1.1852	9708	8279	7206	6346	5629	5013	4474	3994	3563	3170	34
35	1.6143	1.1806	0.9680	0.8259	0.7190	0.6333	0.5618	0.5003	0.4466	0.3987	0.3556	0.3164	35
36	1.6021	1.1761	9652	8239	7174	6320	5607	4994	4457	3979	3549	3157	36
37	1.5902	1.1716	9625	8219	7159	6307	5596	4984	4449	3972	3542	3151	37
38	1.5786	1.1671	9597	8199	7143	6294	5585	4975	4440	3964	3535	3145	38
39	1.5673	1.1627	9570	8179	7128	6282	5574	4965	4432	3957	3529	3139	39
40	1.5563	1.1584	0.9542	0.8159	0.7112	0.6269	0.5563	0.4956	0.4424	0.3949	0.3522	0.3133	40
41	1.5456	1.1541	9515	8140	7097	6256	5552	4947	4415	3942	3515	3126	41
42	1.5351	1.1498	9488	8120	7081	6243	5541	4937	4407	3934	3508	3120	42
43	1.5249	1.1455	9461	8101	7066	6231	5531	4928	4399	3927	3501	3114	43
44	1.5149	1.1413	9434	8081	7050	6218	5520	4918	4390	3919	3495	3108	44
45	1.5051	1.1372	0.9408	0.8062	0.7035	0.6205	0.5509	0.4909	0.4382	0.3912	0.3488	0.3102	45
46	1.4956	1.1331	9382	8043	7020	6193	5498	4900	4374	3905	3481	3096	46
47	1.4863	1.1290	9356	8023	7005	6180	5488	4890	4365	3897	3475	3089	47
48	1.4771	1.1249	9330	8004	6990	6168	5477	4881	4357	3890	3468	3083	48
49	1.4682	1.1209	9305	7985	6975	6155	5466	4872	4349	3882	3461	3077	49
50	1.4594	1.1170	0.9279	0.7966	0.6960	0.6143	0.5455	0.4863	0.4341	0.3875	0.3454	0.3071	50
51	1.4508	1.1130	9254	7947	6945	6131	5445	4853	4333	3868	3448	3065	51
52	1.4424	1.1091	9228	7929	6930	6118	5435	4844	4324	3860	3441	3059	52
53	1.4342	1.1053	9203	7910	6915	6106	5424	4835	4316	3853	3434	3053	53
54	1.4260	1.1015	9178	7891	6900	6094	5414	4826	4308	3846	3428	3047	54
55	1.4180	1.0977	0.9153	0.7873	0.6885	0.6081	0.5403	0.4817	0.4300	0.3838	0.3421	0.3041	55
56	1.4102	1.0940	9128	7854	6871	6069	5393	4808	4292	3831	3415	3034	56
57	1.4025	1.0902	9104	7836	6856	6057	5382	4798	4284	3824	3408	3028	57
58	1.3949	1.0865	9079	7818	6841	6045	5372	4789	4276	3817	3401	3022	58
59	1.3875	1.0828	9055	7800	6827	6033	5361	4780	4268	3809	3395	3016	59
	0	1	2	3	4	5	6	7	8	9	10	11	

TABLE X.

Logarithms for finding the Correction of the Sun's Declination, &c.

Min. or Sec.	HOURS, DEGREES, OR MINUTES.												Min. or Sec.
	12	13	14	15	16	17	18	19	20	21	22	23	
0	0.3010	0.2663	0.2341	0.2041	0.1761	0.1498	0.1249	0.1015	0.0792	0.0580	0.0378	0.0185	0
1	3004	2657	2336	2036	1756	1493	1245	1011	0788	0576	0375	0182	1
2	2998	2652	2330	2031	1752	1489	1241	1007	0785	0573	0371	0179	2
3	2992	2646	2325	2027	1747	1485	1237	1003	0781	0570	0368	0175	3
4	2986	2640	2320	2022	1743	1481	1233	0999	0777	0566	0365	0172	4
5	0.2980	0.2635	0.2315	0.2017	0.1738	0.1476	0.1229	0.0996	0.0774	0.0563	0.0361	0.0169	5
6	2974	2629	2310	2012	1734	1472	1225	0992	0770	0559	0358	0166	6
7	2968	2624	2305	2008	1729	1468	1221	0988	0767	0556	0355	0163	7
8	2962	2618	2300	2003	1725	1464	1217	0984	0763	0552	0352	0160	8
9	2956	2613	2295	1998	1720	1459	1213	0980	0759	0549	0348	0157	9
10	0.2950	0.2607	0.2289	0.1993	0.1716	0.1455	0.1209	0.0977	0.0756	0.0546	0.0345	0.0153	10
11	2944	2602	2284	1988	1711	1451	1205	0973	0753	0542	0342	0150	11
12	2938	2596	2279	1984	1707	1447	1201	0969	0749	0539	0339	0147	12
13	2933	2591	2274	1979	1702	1443	1197	0965	0745	0535	0335	0144	13
14	2927	2585	2269	1974	1698	1438	1193	0962	0741	0532	0332	0141	14
15	0.2921	0.2580	0.2264	0.1969	0.1694	0.1434	0.1189	0.0958	0.0738	0.0528	0.0329	0.0138	15
16	2915	2574	2259	1965	1689	1430	1185	0954	0734	0525	0326	0135	16
17	2909	2569	2254	1960	1685	1426	1181	0950	0731	0522	0322	0132	17
18	2903	2564	2249	1955	1680	1422	1178	0947	0727	0518	0319	0128	18
19	2897	2558	2244	1950	1676	1417	1174	0943	0724	0515	0316	0125	19
20	0.2891	0.2553	0.2239	0.1946	0.1671	0.1413	0.1170	0.0939	0.0720	0.0511	0.0313	0.0122	20
21	2885	2547	2234	1941	1667	1409	1166	0935	0716	0508	0309	0119	21
22	2880	2542	2229	1936	1662	1405	1162	0932	0713	0505	0306	0116	22
23	2874	2536	2223	1932	1658	1401	1158	0928	0709	0501	0303	0113	23
24	2868	2531	2218	1927	1654	1397	1154	0924	0706	0498	0300	0110	24
25	0.2862	0.2526	0.2213	0.1922	0.1649	0.1392	0.1150	0.0920	0.0702	0 0495	0.0296	0.0107	25
26	2856	2520	2208	1917	1645	1388	1146	0917	0699	0491	0293	0104	26
27	2850	2515	2203	1913	1640	1384	1142	0913	0695	0488	0290	0101	27
28	2845	2510	2198	1908	1636	1380	1138	0909	0692	0484	0287	0098	28
29	2839	2504	2193	1903	1632	1376	1134	0905	0688	0481	0283	0094	29
30	0.2833	0.2499	0.2188	0.1899	0.1627	0.1372	0.1130	0.0902	0.0685	0.0478	0.0280	0.0091	30
31	2827	2493	2183	1894	1623	1368	1126	0898	0681	0474	0277	0088	31
32	2821	2488	2178	1889	1618	1363	1123	0895	0677	0471	0274	0085	32
33	2816	2483	2173	1885	1614	1359	1119	0891	0674	0468	0271	0082	33
34	2810	2477	2168	1880	1610	1355	1115	0887	0670	0464	0267	0079	34
35	0.2804	0.2472	0.2163	0.1875	0.1605	0.1351	0.1111	0.0883	0.0667	0.0461	0.0264	0.0076	35
36	2798	2467	2159	1871	1601	1347	1107	0880	0663	0458	0261	0073	36
37	2793	2461	2154	1866	1597	1343	1103	0876	0660	0454	0258	0070	37
38	2787	2456	2149	1862	1592	1339	1099	0872	0656	0451	0255	0067	38
39	2781	2451	2144	1857	1588	1335	1095	0868	0653	0447	0251	0064	39
40	0.2775	0.2445	0.2139	0.1852	0.1584	0.1331	0.1091	0.0865	0.0649	0.0444	0.0248	0.0061	40
41	2770	2440	2134	1848	1579	1326	1088	0861	0646	0441	0245	0058	41
42	2764	2435	2129	1843	1575	1322	1084	0858	0642	0438	0242	0055	42
43	2758	2430	2124	1838	1571	1318	1080	0854	0639	0434	0239	0052	43
44	2753	2424	2119	1834	1566	1314	1076	0850	0635	0431	0235	0048	44
45	0.2747	0.2419	0.2114	0.1829	0.1562	0.1310	0.1072	0.0846	0.0632	0.0427	0.0232	0.0045	45
46	2741	2414	2109	1825	1558	1306	1068	0843	0628	0424	0229	0042	46
47	2736	2409	2104	1820	1553	1302	1064	0839	0625	0421	0226	0039	47
48	2730	2403	2099	1816	1549	1298	1060	0835	0621	0418	0223	0036	48
49	2724	2398	2095	1811	1545	1294	1057	0832	0618	0414	0220	0033	49
50	0.2719	0.2393	0.2090	0.1806	0.1540	0.1290	0.1053	0.0828	0.0614	0.0411	0.0216	0.0030	50
51	2713	2388	2085	1802	1536	1286	1049	0824	0611	0408	0213	0027	51
52	2707	2382	2080	1797	1532	1282	1045	0821	0608	0404	0210	0024	52
53	2702	2377	2075	1793	1527	1278	1041	0817	0604	0401	0207	0021	53
54	2696	2372	2070	1788	1523	1274	1037	0814	0601	0398	0204	0018	54
55	0.2690	0.2367	0.2065	0.1784	0.1519	0.1270	0.1034	0.0810	0.0597	0.0394	0.0201	0.0015	55
56	2685	2362	2061	1779	1515	1265	1030	0806	0594	0391	0197	0012	56
57	2679	2356	2056	1774	1510	1261	1026	0803	0590	0388	0194	0009	57
58	2674	2351	2051	1770	1506	1257	1022	0799	0587	0384	0191	0006	58
59	2668	2346	2046	1765	1502	1253	1018	0795	0583	0381	0188	0003	59
	12	13	14	15	16	17	18	19	20	21	22	23	

TABLE XI.

Logarithms of the Latitude and Polar Distance.

M.	SECANTS. LATITUDE, OR POLAR DISTANCE. 0° 0 or 90	0° 1 . 91	0° 2 . 92	0° 3 . 93	0° 4 . 94	0° 5 . 95	0° 6 . 96	0° 7 . 97	0° 8 . 98	0° 9 . 99	
0	0.00000	00007	00026	00060	00106	00166	00239	00325	00425	00538	60
1	00000	00007	00027	00060	00107	00167	00240	00326	00426	00540	59
2	00000	00007	00027	00061	00108	00168	00241	00328	00428	00542	58
3	00000	00007	00028	00062	00108	00169	00243	00330	00430	00544	57
4	00000	00008	00028	00062	00109	00170	00244	00331	00432	00546	56
5	0.00000	00008	00029	00063	00110	00171	00245	00333	00434	00548	55
6	00000	00008	00029	00064	00111	00172	00247	00334	00435	00550	54
7	00000	00008	00030	00064	00112	00173	00248	00336	00437	00552	53
8	00000	00008	00030	00065	00113	00175	00249	00337	00439	00554	52
9	00000	00009	00031	00066	00114	00176	00251	00339	00441	00556	51
10	0.00000	00009	00031	00066	00115	00177	00252	00341	00443	00558	50
11	00000	00009	00032	00067	00116	00178	00253	00342	00444	00560	49
12	00000	00010	00032	00068	00117	00179	00255	00344	00446	00562	48
13	00000	00010	00033	00068	00118	00180	00256	00345	00448	00564	47
14	00000	00010	00033	00069	00119	00181	00258	00347	00450	00566	46
15	0.00000	00010	00033	00070	00120	00183	00259	00349	00452	00568	45
16	00000	00011	00034	00071	00121	00184	00260	00350	00454	00571	44
17	00001	00011	00034	00071	00121	00185	00262	00352	00455	00573	43
18	00001	00011	00035	00072	00122	00186	00263	00353	00457	00575	42
19	00001	00011	00036	00073	00123	00187	00264	00355	00459	00577	41
20	0.00001	00012	00036	00074	00124	00188	00266	00357	00461	00579	40
21	00001	00012	00037	00074	00125	00190	00267	00358	00463	00581	39
22	00001	00012	00037	00075	00126	00191	00269	00360	00465	00583	38
23	00001	00013	00038	00076	00127	00192	00270	00362	00467	00585	37
24	00001	00013	00038	00077	00128	00193	00272	00363	00468	00587	36
25	0.00001	00013	00039	00077	00129	00194	00273	00365	00470	00589	35
26	00001	00014	00039	00078	00130	00196	00274	00367	00472	00591	34
27	00001	00014	00040	00079	00131	00197	00276	00368	00474	00593	33
28	00001	00014	00040	00080	00132	00198	00277	00370	00476	00596	32
29	00002	00015	00041	00080	00133	00199	00279	00371	00478	00598	31
30	0.00002	00015	00041	00081	00134	00200	00280	00373	00480	00600	30
31	00002	00015	00042	00082	00135	00202	00282	00375	00482	00602	29
32	00002	00016	00042	00083	00136	00203	00283	00376	00483	00604	28
33	00002	00016	00043	00083	00137	00204	00284	00378	00485	00606	27
34	00002	00016	00044	00084	00138	00205	00286	00380	00487	00608	26
35	0.00002	00017	00044	00085	00139	00207	00287	00382	00489	00610	25
36	00002	00017	00045	00086	00140	00208	00289	00383	00491	00612	24
37	00003	00017	00045	00087	00141	00209	00290	00385	00493	00615	23
38	00003	00018	00046	00087	00142	00210	00292	00387	00495	00617	22
39	00003	00018	00046	00088	00143	00212	00293	00388	00497	00619	21
40	0.00003	00018	00047	00089	00144	00213	00295	00390	00499	00621	20
41	00003	00019	00048	00090	00145	00214	00296	00392	00501	00623	19
42	00003	00019	00048	00091	00146	00215	00298	00393	00503	00625	18
43	00003	00019	00049	00091	00147	00217	00299	00395	00505	00628	17
44	00004	00020	00049	00092	00148	00218	00301	00397	00506	00630	16
45	0.00004	00020	00050	00093	00149	00219	00302	00399	00508	00632	15
46	00004	00021	00051	00094	00150	00220	00304	00400	00510	00634	14
47	00004	00021	00051	00095	00152	00222	00305	00402	00512	00636	13
48	00004	00021	00052	00096	00153	00223	00307	00404	00514	00638	12
49	00004	00022	00052	00096	00154	00224	00308	00405	00516	00641	11
50	0.00005	00022	00053	00097	00155	00225	00310	00407	00518	00643	10
51	00005	00023	00054	00098	00156	00227	00311	00409	00520	00645	9
52	00005	00023	00054	00099	00157	00228	00313	00411	00522	00647	8
53	00005	00023	00055	00100	00158	00229	00314	00412	00524	00649	7
54	00005	00024	00056	00101	00159	00231	00316	00414	00526	00652	6
55	0.00006	00024	00056	00102	00160	00232	00317	00416	00528	00654	5
56	00006	00025	00057	00102	00161	00233	00319	00418	00530	00656	4
57	00006	00025	00058	00103	00162	00235	00320	00419	00532	00658	3
58	00006	00026	00058	00104	00163	00236	00322	00421	00534	00660	2
59	00006	00026	00059	00105	00164	00237	00323	00423	00536	00663	1
60	00006	00026	00060	00106	00165	00239	00325	00425	00538	00665	0
	89°	88°	87°	86°	85°	84°	83°	82°	81°	80°	M.
	POLAR DISTANCE.								COSECANTS.		

TABLE XI.

Logarithms of the Latitude and Polar Distance.

	SECANTS.			LATITUDE, OR POLAR DISTANCE.						
M.	10 or 100	11.101	12.102	13.103	14.104	15.105	16.106	17.107	18.108	19.109	
0	0.00665	00805	00960	01128	01310	01506	01716	01940	02179	02433	60
1	00667	00808	00962	01131	01313	01509	01719	01944	02183	02437	59
2	00669	00810	00965	01133	01316	01512	01723	01948	02188	02442	58
3	00672	00813	00968	01136	01319	01516	01727	01952	02192	02446	57
4	00674	00815	00970	01139	01322	01519	01730	01956	02196	02450	56
5	0.00676	00818	00973	01142	01325	01523	01734	01960	02200	02455	55
6	00678	00820	00976	01145	01329	01526	01738	01964	02204	02459	54
7	00681	00823	00978	01148	01332	01529	01741	01968	02208	02464	53
8	00683	00825	00981	01151	01335	01533	01745	01971	02212	02468	52
9	00685	00828	00984	01154	01338	01536	01748	01975	02216	02472	51
10	0.00687	00830	00987	01157	01341	01540	01752	01979	02221	02477	50
11	00690	00833	00989	01160	01344	01543	01756	01983	02225	02481	49
12	00692	00835	00992	01163	01348	01547	01760	01987	02229	02485	48
13	00694	00838	00995	01166	01351	01550	01763	01991	02233	02490	47
14	00696	00840	00998	01169	01354	01553	01767	01995	02237	02494	46
15	0.00699	00843	01000	01172	01357	01557	01771	01999	02241	02499	45
16	00701	00845	01003	01175	01360	01560	01774	02003	02246	02503	44
17	00703	00848	01006	01178	01364	01564	01778	02007	02250	02508	43
18	00706	00850	01009	01181	01367	01567	01782	02011	02254	02512	42
19	00708	00853	01011	01184	01370	01571	01785	02014	02258	02516	41
20	0.00710	00855	01014	01187	01373	01574	01789	02018	02262	02521	40
21	00712	00858	01017	01190	01377	01578	01793	02022	02266	02525	39
22	00715	00860	01020	01193	01380	01581	01796	02026	02271	02530	38
23	00717	00863	01022	01196	01383	01585	01800	02030	02275	02534	37
24	00719	00865	01025	01199	01386	01588	01804	02034	02279	02539	36
25	0.00722	00868	01028	01202	01390	01591	01808	02038	02283	02543	35
26	00724	00870	01031	01205	01393	01595	01811	02042	02287	02547	34
27	00726	00873	01033	01208	01396	01598	01815	02046	02292	02552	33
28	00729	00876	01036	01211	01399	01602	01819	02050	02296	02556	32
29	00731	00878	01039	01214	01403	01605	01823	02054	02300	02561	31
30	0.00733	00881	01042	01217	01406	01609	01826	02058	02304	02565	30
31	00736	00883	01045	01220	01409	01612	01830	02062	02309	02570	29
32	00738	00886	01047	01223	01412	01616	01834	02066	02313	02574	28
33	00740	00888	01050	01226	01416	01619	01838	02070	02317	02579	27
34	00743	00891	01053	01229	01419	01623	01841	02074	02321	02583	26
35	0.00745	00894	01056	01232	01422	01627	01845	02078	02326	02588	25
36	00748	00896	01059	01235	01426	01630	01849	02082	02330	02592	24
37	00750	00899	01062	01238	01429	01634	01853	02086	02334	02597	23
38	00752	00901	01064	01241	01432	01637	01856	02090	02338	02601	22
39	00755	00904	01067	01244	01435	01641	01860	02094	02343	02606	21
40	0.00757	00907	01070	01247	01439	01644	01864	02098	02347	02610	20
41	00759	00909	01073	01250	01442	01648	01868	02102	02351	02615	19
42	00762	00912	01076	01254	01445	01651	01871	02106	02355	02619	18
43	00764	00914	01079	01257	01449	01655	01875	02110	02360	02624	17
44	00767	00917	01081	01260	01452	01658	01879	02114	02364	02628	16
45	0 00769	00920	01084	01263	01455	01662	01883	02118	02368	02633	15
46	00771	00922	01087	01266	01459	01666	01887	02122	02372	02637	14
47	00774	00925	01090	01269	01462	01669	01890	02126	02377	02642	13
48	00776	00928	01093	01272	01465	01673	01894	02130	02381	02647	12
49	00779	00930	01096	01275	01469	01676	01898	02134	02385	02651	11
50	0.00781	00933	01099	01278	01472	01680	01902	02139	02390	02656	10
51	00783	00936	01102	01281	01475	01683	01906	02143	02394	02660	9
52	00786	00938	01104	01285	01479	01687	01910	02147	02398	02665	8
53	00788	00941	01107	01288	01482	01691	01913	02151	02403	02669	7
54	00791	00944	01110	01291	01485	01694	01917	02155	02407	02674	6
55	0.00793	00946	01113	01294	01489	01698	01921	02159	02411	02678	5
56	00796	00949	01116	01297	01492	01701	01925	02163	02416	02683	4
57	00798	00952	01119	01300	01495	01705	01929	02167	02420	02688	3
58	00800	00954	01122	01303	01499	01709	01933	02171	02424	02692	2
59	00803	00957	01125	01306	01502	01712	01937	02175	02429	02697	1
60	00805	00960	01128	01310	01506	01716	01940	02179	02433	02701	0
	79°	78°	77°	76°	75°	74°	73°	72°	71°	70°	M.
	POLAR DISTANCE.								COSECANTS.		

TABLE XI.

Logarithms of the Latitude and Polar Distance.

M.	SECANTS. LATITUDE, OR POLAR DISTANCE. 20° or 110°	21.111	22.112	23.113	24.114	25.115	26.116	27.117	28.118	29.119	M.
0	0.02701	02985	03283	03597	03927	04272	04634	05012	05407	05818	60
1	02706	02990	03289	03603	03933	04278	04640	05018	05413	05825	59
2	02711	02995	03294	03608	03938	04284	04646	05025	05420	05832	58
3	02715	02999	03299	03613	03944	04290	04652	05031	05427	05839	57
4	02720	03004	03304	03619	03950	04296	04659	05038	05433	05846	56
5	0.02724	03009	03309	03624	03955	04302	04665	05044	05440	05853	55
6	02729	03014	03314	03630	03961	04308	04671	05051	05447	05860	54
7	02734	03019	03319	03635	03966	04314	04677	05057	05454	05867	53
8	02738	03024	03324	03640	03972	04320	04683	05064	05460	05874	52
9	02743	03029	03330	03646	03978	04326	04690	05070	05467	05881	51
10	0.02748	03034	03335	03651	03983	04332	04696	05077	05474	05888	50
11	02752	03038	03340	03657	03989	04337	04702	05083	05481	05895	49
12	02757	03043	03345	03662	03995	04343	04708	05089	05487	05902	48
13	02762	03048	03350	03667	04000	04349	04714	05096	05494	05910	47
14	02766	03053	03355	03673	04006	04355	04721	05102	05501	05917	46
15	0.02771	03058	03360	03678	04012	04361	04727	05109	05508	05924	45
16	02776	03063	03366	03684	04018	04367	04733	05115	05515	05931	44
17	02780	03068	03371	03689	04023	04373	04739	05122	05521	05938	43
18	02785	03073	03376	03695	04029	04379	04746	05129	05528	05945	42
19	02790	03078	03381	03700	04035	04385	04752	05135	05535	05952	41
20	0.02794	03083	03386	03706	04040	04391	04758	05142	05542	05959	40
21	02799	03088	03392	03711	04046	04397	04764	05148	05549	05966	39
22	02804	03093	03397	03716	04052	04403	04771	05155	05555	05973	38
23	02808	03097	03402	03722	04058	04409	04777	05161	05562	05980	37
24	02813	03102	03407	03727	04063	04415	04783	05168	05569	05988	36
25	0.02818	03107	03412	03733	04069	04421	04789	05174	05576	05995	35
26	02822	03112	03418	03738	04075	04427	04796	05181	05583	06002	34
27	02827	03117	03423	03744	04080	04433	04802	05187	05590	06009	33
28	02832	03122	03428	03749	04086	04439	04808	05194	05596	06016	32
29	02837	03127	03433	03755	04092	04445	04815	05201	05603	06023	31
30	0.02841	03132	03438	03760	04098	04451	04821	05207	05610	06030	30
31	02846	03137	03444	03766	04103	04457	04827	05214	05617	06037	29
32	02851	03142	03449	03771	04109	04463	04833	05220	05624	06045	28
33	02855	03147	03454	03777	04115	04469	04840	05227	05631	06052	27
34	02860	03152	03459	03782	04121	04475	04846	05233	05638	06059	26
35	0.02865	03157	03465	03788	04127	04481	04852	05240	05645	06066	25
36	02870	03162	03470	03793	04132	04487	04859	05247	05651	06073	24
37	02874	03167	03475	03799	04138	04493	04865	05253	05658	06080	23
38	02879	03172	03480	03804	04144	04500	04871	05260	05665	06088	22
39	02884	03177	03486	03810	04150	04506	04878	05266	05672	06095	21
40	0.02889	03182	03491	03815	04156	04512	04884	05273	05679	06102	20
41	02893	03187	03496	03821	04161	04518	04890	05280	05686	06109	19
42	02898	03192	03502	03826	04167	04524	04897	05286	05693	06116	18
43	02903	03197	03507	03832	04173	04530	04903	05293	05700	06124	17
44	02908	03202	03512	03838	04179	04536	04910	05300	05707	06131	16
45	0.02913	03207	03517	03843	04185	04542	04916	05306	05714	06138	15
46	02917	03212	03523	03849	04190	04548	04922	05313	05721	06145	14
47	02922	03217	03528	03854	04196	04554	04929	05320	05727	06153	13
48	02927	03222	03533	03860	04202	04560	04935	05326	05734	06160	12
49	02932	03228	03539	03865	04208	04566	04941	05333	05741	06167	11
50	0.02937	03233	03544	03871	04214	04573	04948	05340	05748	06174	10
51	02941	03238	03549	03877	04220	04579	04954	05346	05755	06181	9
52	02946	03243	03555	03882	04225	04585	04961	05353	05762	06189	8
53	02951	03248	03560	03888	04231	04591	04967	05360	05769	06196	7
54	02956	03253	03565	03893	04237	04597	04973	05366	05776	06203	6
55	0.02961	03258	03571	03899	04243	04603	04980	05373	05783	06211	5
56	02965	03263	03576	03905	04249	04609	04986	05380	05790	06218	4
57	02970	03268	03581	03910	04255	04616	04993	05386	05797	06225	3
58	02975	03273	03587	03916	04261	04622	04999	05393	05804	06232	2
59	02980	03278	03592	03921	04267	04628	05005	05400	05811	06240	1
60	02985	03283	03597	03927	04272	04634	05012	05407	05818	06247	0
	69°	68°	67°	66°	65°	64°	63°	62°	61°	60°	M.
	POLAR DISTANCE.							COSECANTS.			

Logarithms of the Latitude and Polar Distance.

M.	SECANTS. 30 or 120	31.121	32.122	33.123	34.124	35.125	36.126	27.127	38.128	39.129	
	LATITUDE, OR POLAR DISTANCE										
0	0.06247	06693	07158	07641	08143	08664	09204	09765	10347	10950	60
1	06254	06701	07166	07649	08151	08672	09213	09775	10357	10960	59
2	06262	06709	07174	07657	08160	08681	09223	09784	10367	10970	58
3	06269	06716	07182	07665	08168	08690	09232	09794	10376	10980	57
4	06276	06724	07190	07674	08177	08699	09241	09803	10386	10991	56
5	0.06283	06731	07197	07682	08185	08708	09250	09813	10396	11001	55
6	06291	06739	07205	07690	08194	08717	09259	09822	10406	11011	54
7	06298	06747	07213	07698	08202	08726	09269	09832	10416	11022	53
8	06305	06754	07221	07707	08211	08734	09278	09841	10426	11032	52
9	06313	06762	07229	07715	08219	08743	09287	09851	10436	11042	51
10	0.06320	06770	07237	07723	08228	08752	09296	09861	10446	11052	50
11	06327	06777	07245	07731	08237	08761	09306	09870	10456	11063	49
12	06335	06785	07253	07740	08245	08770	09315	09880	10466	11073	48
13	06342	06793	07261	07748	08254	08779	09324	09889	10476	11083	47
14	06350	06800	07269	07756	08262	08788	09333	09899	10486	11094	46
15	0.06357	06808	07277	07765	08271	08797	09343	09909	10496	11104	45
16	06364	06816	07285	07773	08280	08806	09352	09918	10505	11114	44
17	06372	06823	07293	07781	08288	08815	09361	09928	10515	11125	43
18	06379	06831	07301	07789	08297	08824	09370	09937	10525	11135	42
19	06386	06839	07309	07798	08305	08833	09380	09947	10535	11145	41
20	0.06394	06846	07317	07806	08314	08842	09389	09957	10545	11156	40
21	06401	06854	07325	07814	08323	08851	09398	09966	10555	11166	39
22	06409	06862	07333	07823	08331	08859	09408	09976	10565	11176	38
23	06416	06869	07341	07831	08340	08868	09417	09986	10575	11187	37
24	06423	06877	07349	07839	08349	08877	09426	09995	10585	11197	36
25	0.06431	06885	07357	07848	08357	08886	09435	10005	10595	11207	35
26	06438	06892	07365	07856	08366	08895	09445	10015	10605	11218	34
27	06446	06900	07373	07864	08375	08904	09454	10024	10615	11228	33
28	06453	06908	07381	07873	08383	08913	09463	10034	10625	11239	32
29	06461	06916	07389	07881	08392	08922	09473	10044	10636	11249	31
30	0.06468	06923	07397	07889	08401	08931	09482	10053	10646	11259	30
31	06475	06931	07405	07898	08409	08940	09491	10063	10656	11270	29
32	06483	06939	07413	07906	08418	08949	09501	10073	10666	11280	28
33	06490	06947	07421	07914	08427	08958	09510	10082	10676	11291	27
34	06498	06954	07429	07923	08435	08967	09520	10092	10686	11301	26
35	0.06505	06962	07437	07931	08444	08977	09529	10102	10696	11312	25
36	06513	06970	07445	07940	08453	08986	09538	10112	10706	11322	24
37	06520	06978	07454	07948	08462	08995	09548	10121	10716	11332	23
38	06528	06986	07462	07956	08470	09004	09557	10131	10726	11343	22
39	06535	06993	07470	07965	08479	09013	09566	10141	10736	11353	21
40	0.06543	07001	07478	07973	08488	09022	09576	10151	10746	11364	20
41	06550	07009	07486	07982	08496	09031	09585	10160	10756	11374	19
42	06558	07017	07494	07990	08505	09040	09595	10170	10767	11385	18
43	06565	07024	07502	07998	08514	09049	09604	10180	10777	11395	17
44	06573	07032	07510	08007	08523	09058	09614	10190	10787	11406	16
45	0.06580	07040	07518	08015	08531	09067	09623	10199	10797	11416	15
46	06588	07048	07527	08024	08540	09076	09632	10209	10807	11427	14
47	06595	07056	07535	08032	08549	09085	09642	10219	10817	11437	13
48	06603	07064	07543	08041	08558	09094	09651	10229	10827	11448	12
49	06610	07071	07551	08049	08567	09104	09661	10239	10838	11458	11
50	0.06618	07079	07559	08058	08575	09113	09670	10248	10848	11469	10
51	06625	07087	07567	08066	08584	09122	09680	10258	10858	11479	9
52	06633	07095	07575	08075	08593	09131	09689	10268	10868	11490	8
53	06640	07103	07584	08084	08602	09140	09699	10278	10878	11501	7
54	06648	07111	07592	08092	08611	09149	09708	10288	10888	11511	6
55	0.06656	07119	07600	08100	08619	09158	09718	10298	10899	11522	5
56	06663	07126	07608	08109	08628	09168	09727	10307	10909	11532	4
57	06671	07134	07616	08117	08637	09177	09737	10317	10919	11543	3
58	06678	07142	07624	08126	08646	09186	09746	10327	10929	11553	2
59	06686	07150	07633	08134	08655	09195	09756	10337	10940	11564	1
60	06693	07158	07641	08143	08664	09204	09765	10347	10950	11575	0
	59°	58°	57°	56°	55°	54°	53°	52°	51°	50°	M.
	POLAR DISTANCE.							COSECANTS.			

TABLE XI.

Logarithms of the Latitude and Polar Distance.

M.	SECANTS. LATITUDE, OR POLAR DISTANCE. 40° or 139°	41°.131	42°.132	43°.133	44°.134	45°.135	46°.136	47°.137	48°.138	49°.139	
0	0.11575	12222	12893	13587	14307	15051	15823	16622	17449	18306	60
1	11585	12233	12904	13599	14319	15064	15836	16635	17463	18320	59
2	11596	12244	12915	13611	14331	15077	15849	16649	17477	18335	58
3	11606	12255	12927	13623	14343	15089	15862	16662	17491	18349	57
4	11617	12266	12938	13634	14355	15102	15875	16676	17505	18364	56
5	0.11628	12277	12950	13646	14368	15115	15888	16689	17519	18378	55
6	11638	12288	12961	13658	14380	15127	15901	16703	17533	18393	54
7	11649	12299	12972	13670	14392	15140	15915	16717	17547	18408	53
8	11660	12310	12984	13682	14404	15153	15928	16730	17561	18422	52
9	11670	12321	12995	13694	14417	15165	15941	16744	17576	18437	51
10	0.11681	12332	13007	13705	14429	15178	15954	16758	17590	18451	50
11	11692	12343	13018	13717	14441	15191	15967	16771	17604	18466	49
12	11702	12354	13030	13729	14453	15204	15980	16785	17618	18481	48
13	11713	12365	13041	13741	14466	15216	15994	16798	17632	18495	47
14	11724	12376	13053	13753	14478	15229	16007	16812	17646	18510	46
15	0.11734	12387	13064	13765	14490	15242	16020	16826	17660	18525	45
16	11745	12399	13076	13777	14503	15255	16033	16839	17674	18539	44
17	11756	12410	13087	13789	14515	15267	16046	16853	17689	18554	43
18	11766	12421	13098	13800	14527	15280	16060	16867	17703	18569	42
19	11777	12432	13110	13812	14540	15293	16073	16880	17717	18583	41
20	0.11788	12443	13121	13824	14552	15306	16086	16894	17731	18598	40
21	11799	12454	13133	13836	14564	15318	16099	16908	17745	18613	39
22	11809	12465	13145	13848	14577	15331	16113	16922	17760	18628	38
23	11820	12476	13156	13860	14589	15344	16126	16935	17774	18642	37
24	11831	12487	13168	13872	14601	15357	16139	16949	17788	18657	36
25	0.11842	12499	13179	13884	14614	15370	16152	16963	17802	18672	35
26	11852	12510	13191	13896	14626	15382	16166	16977	17816	18686	34
27	11863	12521	13202	13908	14639	15395	16179	16990	17831	18701	33
28	11874	12532	13214	13920	14651	15408	16192	17004	17845	18716	32
29	11885	12543	13225	13932	14663	15421	16205	17018	17859	18731	31
30	0.11895	12554	13237	13944	14676	15434	16219	17032	17874	18746	30
31	11906	12566	13248	13956	14688	15447	16232	17045	17888	18760	29
32	11917	12577	13260	13968	14701	15460	16245	17059	17902	18775	28
33	11928	12588	13272	13980	14713	15472	16259	17073	17916	18790	27
34	11939	12599	13283	13992	14726	15485	16272	17087	17931	18805	26
35	0.11949	12610	13295	14004	14738	15498	16285	17101	17945	18820	25
36	11960	12622	13306	14016	14750	15511	16299	17115	17959	18834	24
37	11971	12633	13318	14028	14763	15524	16312	17128	17974	18849	23
38	11982	12644	13330	14040	14775	15537	16326	17142	17988	18864	22
39	11993	12655	13341	14052	14788	15550	16339	17156	18002	18879	21
40	0.12004	12666	13353	14064	14800	15563	16352	17170	18017	18894	20
41	12015	12678	13365	14076	14813	15576	16366	17184	18031	18909	19
42	12025	12689	13376	14088	14825	15589	16379	17198	18045	18924	18
43	12036	12700	13388	14100	14838	15602	16392	17212	18060	18939	17
44	12047	12712	13400	14112	14850	15615	16406	17225	18074	18954	16
45	0.12058	12723	13411	14124	14863	15627	16419	17239	18089	18968	15
46	12069	12734	13423	14136	14875	15640	16433	17253	18103	18983	14
47	12080	12745	13435	14149	14888	15653	16446	17267	18118	18998	13
48	12091	12757	13446	14161	14900	15666	16460	17281	18132	19013	12
49	12102	12768	13458	14173	14913	15679	16473	17295	18146	19028	11
50	0.12113	12779	13470	14185	14926	15692	16487	17309	18161	19043	10
51	12123	12791	13482	14197	14938	15705	16500	17323	18175	19058	9
52	12134	12802	13493	14209	14951	15718	16514	17337	18190	19073	8
53	12145	12813	13505	14221	14963	15731	16527	17351	18204	19088	7
54	12156	12825	13517	14234	14976	15745	16541	17365	18219	19103	6
55	0.12167	12836	13528	14246	14988	15758	16554	17379	18233	19118	5
56	12178	12847	13540	14258	15001	15771	16568	17393	18248	19133	4
57	12189	12859	13552	14270	15014	15784	16581	17407	18262	19148	3
58	12200	12870	13564	14282	15026	15797	16595	17421	18277	19163	2
59	12211	12881	13575	14294	15039	15810	16608	17435	18291	19178	1
60	12222	12893	13587	14307	15051	15823	16622	17449	18306	19193	0
	49°	48°	47°	46°	45°	44°	43°	42°	41°	40°	M.
	POLAR DISTANCE.								COSECANTS.		

Logarithms of the Latitude and Polar Distance.

M.	SECANTS. LATITUDE. 50°	51°	52°	53°	54°	55°	56°	57°	58°	59°	M.
0	0.19193	20113	21066	22054	23078	24141	25244	26389	27579	28816	60
1	19208	20128	21082	22070	23096	24159	25263	26409	27599	28837	59
2	19223	20144	21098	22087	23113	24177	25281	26428	27619	28858	58
3	19238	20160	21114	22104	23130	24195	25300	26448	27640	28879	57
4	19254	20175	21131	22121	23148	24213	25319	26467	27660	28900	56
5	0.19269	20191	21147	22138	23165	24231	25338	26487	27680	28921	55
6	19284	20207	21163	22154	23183	24249	25356	26506	27701	28942	54
7	19299	20222	21179	22171	23200	24267	25375	26526	27721	28964	53
8	19314	20238	21195	22188	23218	24286	25394	26545	27741	28985	52
9	19329	20254	21212	22205	23235	24304	25413	26565	27762	29006	51
10	0.19344	20269	21228	22222	23253	24322	25432	26584	27782	29027	50
11	19359	20285	21244	22239	23270	24340	25451	26604	27802	29048	49
12	19375	20301	21261	22256	23288	24358	25469	26623	27823	29069	48
13	19390	20316	21277	22273	23305	24376	25488	26643	27843	29091	47
14	19405	20332	21293	22289	23323	24395	25507	26663	27863	29112	46
15	0.19420	20348	21309	22306	23340	24413	25526	26682	27884	29133	45
16	19435	20364	21326	22323	23358	24431	25545	26702	27904	29154	44
17	19450	20379	21342	22340	23375	24449	25564	26722	27925	29176	43
18	19466	20395	21358	22357	23393	24467	25583	26741	27945	29197	42
19	19481	20411	21375	22374	23410	24486	25602	26761	27966	29218	41
20	0.19496	20427	21391	22391	23428	24504	25621	26781	27986	29239	40
21	19511	20442	21408	22408	23446	24522	25640	26800	28006	29261	39
22	19527	20458	21424	22425	23463	24541	25659	26820	28027	29282	38
23	19542	20474	21440	22442	23481	24559	25678	26840	28048	29303	37
24	19557	20490	21457	22459	23499	24577	25697	26860	28068	29325	36
25	0.19572	20506	21473	22476	23516	24595	25716	26879	28089	29346	35
26	19588	20522	21490	22493	23534	24614	25735	26899	28109	29367	34
27	19603	20537	21506	22510	23552	24632	25754	26919	28130	29389	33
28	19618	20553	21522	22527	23569	24650	25773	26939	28150	29410	32
29	19634	20569	21539	22544	23587	24669	25792	26959	28171	29432	31
30	0.19649	20585	21555	22561	23605	24687	25811	26978	28191	29453	30
31	19664	20601	21572	22578	23622	24706	25830	26998	28212	29475	29
32	19680	20617	21588	22595	23640	24724	25849	27018	28233	29496	28
33	19695	20633	21605	22613	23658	24742	25868	27038	28253	29518	27
34	19710	20649	21621	22630	23676	24761	25887	27058	28274	29539	26
35	0.19726	20665	21638	22647	23693	24779	25907	27078	28295	29561	25
36	19741	20681	21654	22664	23711	24798	25926	27098	28315	29582	24
37	19756	20696	21671	22681	23729	24816	25945	27117	28336	29604	23
38	19772	20712	21687	22698	23747	24835	25964	27137	28357	29625	22
39	19787	20728	21704	22715	23764	24853	25983	27157	28378	29647	21
40	0.19803	20744	21720	22732	23782	24872	26003	27177	28398	29668	20
41	19818	20760	21737	22750	23800	24890	26022	27197	28419	29690	19
42	19834	20776	21754	22767	23818	24909	26041	27217	28440	29712	18
43	19849	20792	21770	22784	23836	24927	26060	27237	28461	29733	17
44	19864	20808	21787	22801	23854	24946	26079	27257	28481	29755	16
45	0.19880	20824	21803	22819	23871	24964	26099	27277	28502	29776	15
46	19895	20840	21820	22836	23889	24983	26118	27297	28523	29798	14
47	19911	20856	21837	22853	23907	25001	26137	27317	28544	29820	13
48	19926	20872	21853	22870	23925	25020	26157	27337	28565	29841	12
49	19942	20889	21870	22888	23943	25039	26176	27357	28586	29863	11
50	0.19957	20905	21887	22905	23961	25057	26195	27378	28607	29885	10
51	19973	20921	21903	22922	23979	25076	26215	27398	28627	29907	9
52	19988	20937	21920	22939	23997	25094	26234	27418	28648	29928	8
53	20004	20953	21937	22957	24015	25113	26253	27438	28669	29950	7
54	20019	20969	21953	22974	24033	25132	26273	27458	28690	29972	6
55	0.20035	20985	21970	22991	24051	25150	26292	27478	28711	29994	5
56	20050	21001	21987	23009	24069	25169	26311	27498	28732	30016	4
57	20066	21017	22003	23026	24087	25188	26331	27518	28753	30037	3
58	20082	21033	22020	23043	24105	25206	26350	27539	28774	30059	2
59	20097	21050	22037	23061	24123	25225	26370	27559	28795	30081	1
60	20113	21066	22054	23078	24141	25244	26389	27579	28816	30103	0
	39°	38°	37°	36°	35°	34°	33°	32°	31°	30°	M.
	POLAR DISTANCE.								COSECANTS.		

TABLE XI.

Logarithms of the Latitude and Polar Distance.

M.	SECANTS. LATITUDE. 60°	61°	62°	63°	64°	65°	66°	67°	68°	69°	
0	0.30103	31443	32839	34295	35816	37405	39069	40812	42642	44567	60
1	30125	31466	32863	34320	35842	37432	39097	40842	42674	44600	59
2	30147	31488	32887	34345	35868	37459	39125	40872	42705	44633	58
3	30169	31511	32910	34370	35894	37487	39154	40902	42736	44666	57
4	30191	31534	32934	34395	35920	37514	39182	40931	42768	44699	56
5	0.30213	31557	32958	34420	35946	37541	39211	40961	42799	44732	55
6	30235	31580	32982	34444	35972	37568	39239	40991	42831	44765	54
7	30257	31603	33006	34469	35998	37595	39268	41021	42862	44798	53
8	30279	31626	33030	34494	36024	37623	39296	41051	42893	44831	52
9	30301	31649	33054	34519	36050	37650	39325	41081	42925	44864	51
10	0.30323	31672	33078	34544	36076	37677	39354	41111	42956	44898	50
11	30345	31695	33101	34569	36102	37704	39382	41141	42988	44931	49
12	30367	31718	33125	34594	36128	37732	39411	41171	43020	44964	48
13	30389	31740	33149	34619	36154	37759	39439	41201	43051	44997	47
14	30411	31763	33173	34644	36180	37786	39468	41231	43083	45031	46
15	0.30433	31787	33197	34669	36206	37814	39497	41261	43114	45064	45
16	30455	31810	33221	34694	36233	37841	39526	41291	43146	45097	44
17	30477	31833	33245	34719	36259	37869	39554	41322	43178	45131	43
18	30499	31856	33269	34745	36285	37896	39583	41352	43210	45164	42
19	30521	31879	33294	34770	36311	37924	39612	41382	43241	45198	41
20	0.30544	31902	33318	34795	36338	37951	39641	41412	43273	45231	40
21	30566	31925	33342	34820	36364	37979	39669	41443	43305	45265	39
22	30588	31948	33366	34845	36390	38006	39698	41473	43337	45298	38
23	30610	31971	33390	34870	36417	38034	39727	41503	43369	45332	37
24	30632	31994	33414	34896	36443	38061	39756	41533	43401	45365	36
25	0.30655	32018	33438	34921	36469	38089	39785	41564	43432	45399	35
26	30677	32041	33463	34946	36496	38117	39814	41594	43464	45433	34
27	30699	32064	33487	34971	36522	38144	39843	41625	43496	45466	33
28	30721	32087	33511	34997	36549	38172	39872	41655	43528	45500	32
29	30744	32110	33535	35022	36575	38200	39901	41686	43560	45534	31
30	0.30766	32134	33559	35047	36602	38227	39930	41716	43592	45567	30
31	30788	32157	33584	35073	36628	38255	39959	41747	43625	45601	29
32	30811	32180	33608	35098	36655	38283	39988	41777	43657	45635	28
33	30833	32204	33632	35123	36681	38311	40017	41808	43689	45669	27
34	30856	32227	33657	35149	36708	38338	40046	41838	43721	45703	26
35	0.30878	32250	33681	35174	36734	38366	40076	41869	43753	45737	25
36	30900	32274	33705	35200	36761	38394	40105	41899	43785	45771	24
37	30923	32297	33730	35225	36787	38422	40134	41930	43818	45805	23
38	30945	32320	33754	35251	36814	38450	40163	41961	43850	45839	22
39	30968	32344	33779	35276	36841	38478	40192	41992	43882	45873	21
40	0.30990	32367	33803	35302	36867	38506	40222	42022	43915	45907	20
41	31013	32391	33827	35327	36894	38534	40251	42053	43947	45941	19
42	31035	32414	33852	35353	36921	38562	40280	42084	43979	45975	18
43	31058	32438	33876	35378	36948	38590	40310	42115	44012	46009	17
44	31080	32461	33901	35404	36974	38618	40339	42145	44044	46043	16
45	0.31103	32485	33925	35429	37001	38646	40368	42176	44077	46078	15
46	31125	32508	33950	35455	37028	38674	40398	42207	44109	46112	14
47	31148	32532	33975	35481	37055	38702	40427	42238	44142	46146	13
48	31171	32555	33999	35506	37082	38730	40457	42269	44174	46181	12
49	31193	32579	34024	35532	37108	38758	40486	42300	44207	46215	11
50	0.31216	32602	34048	35558	37135	38786	40516	42331	44239	46249	10
51	31238	32626	34073	35583	37162	38814	40545	42362	44272	46284	9
52	31261	32650	34098	35609	37189	38842	40575	42393	44305	46318	8
53	31284	32673	34122	35635	37216	38871	40604	42424	44337	46353	7
54	31306	32697	34147	35661	37243	38899	40634	42455	44370	46387	6
55	0.31329	32720	34172	35687	37270	38927	40664	42486	44403	46422	5
56	31352	32744	34196	35712	37297	38955	40693	42518	44436	46456	4
57	31375	32768	34221	35738	37324	38984	40723	42549	44468	46491	3
58	31397	32792	34246	35764	37351	39012	40753	42580	44501	46525	2
59	31420	32815	34271	35790	37378	39040	40782	42611	44534	46560	1
60	31443	32839	34295	35816	37405	39069	40812	42642	44567	46595	0
	29°	28°	27°	26°	25°	24°	23°	22°	21°	20°	M.
	POLAR DISTANCE.								COSECANTS.		

TABLE XI.

Logarithms of the Latitude and Polar Distance.

M.	SECANTS. 70°	71°	72°	73°	LATITUDE. 74°	75°	76°	77°	78°	79°	
0	0.46595	48736	51002	53406	55966	58700	61632	64791	68212	71940	60
1	46630	48773	51041	53448	56010	58748	61683	64846	68272	72005	59
2	46664	48809	51080	53489	56054	58795	61734	64901	68331	72070	58
3	46699	48846	51119	53531	56099	58842	61785	64956	68391	72136	57
4	46734	48883	51158	53572	56143	58890	61836	65011	68451	72201	56
5	0.46769	48920	51197	53614	56187	58937	61887	65066	68510	72266	55
6	46804	48957	51236	53655	56231	58984	61938	65121	68570	72332	54
7	46839	48993	51275	53697	56276	59032	61989	65176	68630	72398	53
8	46874	49030	51314	53738	56320	59079	62040	65231	68690	72463	52
9	46908	49067	51353	53780	56365	59127	62091	65287	68750	72528	51
10	0.46944	49104	51393	53822	56409	59175	62142	65342	68811	72595	50
11	46979	49142	51432	53864	56454	59222	62194	65398	68871	72661	49
12	47014	49179	51471	53905	56498	59270	62245	65453	68932	72727	48
13	47049	49216	51510	53947	56543	59318	62297	65509	68992	72794	47
14	47084	49253	51550	53989	56588	59366	62348	65564	69053	72860	46
15	0.47119	49290	51589	54031	56633	59414	62400	65620	69113	72927	45
16	47154	49327	51629	54073	56677	59462	62451	65676	69174	72993	44
17	47189	49365	51668	54115	56722	59510	62503	65732	69235	73060	43
18	47225	49402	51708	54157	56767	59558	62555	65788	69296	73127	42
19	47260	49439	51748	54199	56812	59606	62607	65844	69357	73194	41
20	0.47295	49477	51787	54242	56857	59654	62659	65900	69418	73261	40
21	47331	49514	51827	54284	56902	59703	62711	65957	69479	73328	39
22	47366	49551	51867	54326	56947	59751	62763	66013	69541	73395	38
23	47402	49589	51906	54368	56992	59800	62815	66069	69602	73462	37
24	47437	49626	51946	54411	57038	59848	62867	66126	69664	73530	36
25	0.47473	49664	51986	54453	57083	59897	62919	66182	69725	73597	35
26	47508	49702	52026	54496	57128	59945	62972	66239	69787	73665	34
27	47544	49739	52066	54538	57174	59994	63024	66296	69849	73733	33
28	47579	49777	52106	54581	57219	60042	63076	66353	69910	73801	32
29	47615	49815	52146	54623	57265	60091	63129	66409	69972	73869	31
30	0.47650	49852	52186	54666	57310	60140	63181	66466	70034	73937	30
31	47686	49890	52226	54708	57356	60189	63234	66523	70097	74005	29
32	47722	49928	52266	54751	57401	60238	63287	66580	70159	74073	28
33	47758	49966	52306	54794	57447	60287	63340	66638	70221	74142	27
34	47793	50004	52346	54837	57493	60336	63392	66695	70284	74210	26
35	0.47829	50042	52387	54880	57539	60385	63445	66752	70346	74279	25
36	47865	50080	52427	54923	57584	60434	63498	66810	70409	74348	24
37	47901	50118	52467	54965	57630	60483	63551	66867	70471	74417	23
38	47937	50156	52508	55008	57676	60533	63605	66925	70534	74486	22
39	47973	50194	52548	55052	57722	60582	63658	66982	70597	74555	21
40	0.48009	50232	52589	55095	57768	60631	63711	67040	70660	74624	20
41	48045	50270	52629	55138	57814	60681	63764	67098	70723	74693	19
42	48081	50308	52670	55181	57860	60730	63818	67156	70786	74763	18
43	48117	50346	52710	55224	57907	60780	63871	67214	70850	74832	17
44	48153	50385	52751	55267	57953	60830	63925	67272	70913	74902	16
45	0.48189	50423	52791	55311	57999	60879	63978	67330	70976	74972	15
46	48226	50461	52832	55354	58046	60929	64032	67388	71040	75042	14
47	48262	50500	52873	55398	58092	60979	64086	67447	71104	75112	13
48	48298	50538	52914	55441	58139	61029	64140	67505	71167	75182	12
49	48334	50576	52955	55484	58185	61079	64194	67563	71231	75252	11
50	0.48371	50615	52995	55528	58232	61129	64248	67622	71295	75323	10
51	48407	50653	53036	55572	58278	61179	64302	67681	71359	75393	9
52	48443	50692	53077	55615	58325	61229	64356	67739	71423	75464	8
53	48480	50731	53118	55659	58372	61279	64410	67798	71488	75534	7
54	48516	50769	53159	55703	58418	61330	64464	67857	71552	75605	6
55	0.48553	50808	53200	55747	58465	61380	64519	67916	71616	75676	5
56	48589	50847	53242	55790	58512	61430	64573	67975	71681	75747	4
57	48626	50885	53283	55834	58559	61481	64627	68034	71746	75819	3
58	48662	50924	53324	55878	58606	61531	64682	68093	71810	75890	2
59	48699	50963	53365	55922	58653	61582	64737	68153	71875	75961	1
60	48736	51002	53406	55966	58700	61632	64791	68212	71940	76033	0
	19°	18°	17°	16°	15°	14°	13°	12°	11°	10°	M.
	POLAR DISTANCE.								COSECANTS.		

TABLE XI.

Logarithms of the Latitude and Polar Distance.

M.	SECANTS. 80°	81°	82°	83°	LATITUDE. 84°	85°	86°	87°	88°	89°	
0	0.76033	80567	85644	91411	0.98077	1.05970	1.15642	1.28120	1.45718	1.75814	60
1	76105	80647	85734	91514	98197	06115	15823	28362	46081	76544	59
2	76177	80727	85825	91617	98318	06260	16004	28605	46448	77287	58
3	76248	80807	85915	91720	98439	06406	16187	28849	46817	78042	57
4	76321	80887	86006	91824	98560	06552	16370	29095	47190	78811	56
5	0.76393	80967	86096	91928	0.98682	1.06699	1.16554	1.29342	1.47566	1.79593	55
6	76465	81048	86187	92032	98804	06846	16739	29591	47945	80390	54
7	76538	81129	86278	92137	98926	06993	16925	29841	48327	81202	53
8	76610	81210	86370	92242	99049	07141	17112	30093	48713	82029	52
9	76683	81291	86461	92347	99172	07290	17299	30346	49103	82872	51
10	0.76756	81372	86553	92452	0.99296	1.07439	1.17487	1.30600	1.49495	1.83732	50
11	76829	81453	86645	92558	99419	07589	17676	30856	49892	84609	49
12	76902	81535	86737	92663	99544	07739	17866	31114	50292	85505	48
13	76975	81617	86829	92769	99668	07890	18056	31373	50696	86419	47
14	77048	81698	86922	92876	99793	08041	18248	31633	51104	87353	46
15	0.77122	81780	87015	92982	0.99918	1.08193	1.18440	1.31896	1.51515	1.88307	45
16	77195	81863	87108	93089	1.00044	08345	18633	32159	51931	89283	44
17	77269	81945	87201	93196	00170	08498	18827	32425	52350	90282	43
18	77343	82027	87294	93304	00296	08651	19022	32692	52774	91304	42
19	77417	82110	87388	93411	00423	08805	19218	32961	53201	92350	41
20	0.77491	82193	87481	93519	1.00550	1.08960	1.19415	1.33231	1.53633	1.93422	40
21	77565	82276	87575	93628	00678	09115	19612	33503	54070	94522	39
22	77639	82359	87669	93736	00806	09270	19811	33777	54511	95650	38
23	77714	82442	87764	93845	00934	09426	20010	34053	54956	96808	37
24	77789	82526	87858	93954	01063	09583	20211	34330	55406	97998	36
25	0.77863	82609	87953	94063	1.01192	1.09740	1.20412	1.34609	1.55861	1.99221	35
26	77938	82693	88048	94173	01321	09898	20614	34890	56320	2.00480	34
27	78013	82777	88143	94283	01451	10057	20817	35173	56784	01777	33
28	78088	82861	88239	94393	01581	10216	21021	35457	57254	03113	32
29	78164	82945	88334	94503	01712	10375	21226	35744	57728	04492	31
30	0.78239	83030	88430	94614	1.01843	1.10536	1.21432	1.36032	1.58208	2.05916	30
31	78315	83114	88526	94725	01974	10696	21639	36322	58693	07388	29
32	78390	83199	88623	94836	02106	10858	21848	36615	59184	08912	28
33	78466	83284	88719	94948	02238	11020	22057	36909	59680	10491	27
34	78542	83369	88816	95060	02371	11183	22267	37205	60182	12130	26
35	0.78618	83455	88913	95172	1.02504	1.11346	1.22478	1.37503	1.60690	2.13834	25
36	78694	83540	89010	95285	02637	11510	22690	37804	61204	15607	24
37	78771	83626	89107	95397	02771	11674	22903	38106	61724	17455	23
38	78847	83711	89205	95510	02905	11839	23117	38411	62250	19385	22
39	78924	83797	89303	95624	03040	12005	23332	38718	62783	21406	21
40	0.79001	83884	89401	95738	1.03175	1.12171	1.23549	1.39027	1.63322	2.23525	20
41	79078	83970	89499	95851	03311	12339	23766	39338	63868	25752	19
42	79155	84056	89598	95966	03447	12506	23985	39651	64422	28100	18
43	79232	84143	89696	96080	03583	12675	24204	39967	64982	30583	17
44	79309	84230	89795	96195	03720	12844	24425	40285	65550	33216	16
45	0.79387	84317	89894	96310	1.03857	1.13013	1.24647	1.40605	1.66125	2.36018	15
46	79465	84404	89994	96426	03995	13184	24870	40928	66708	39015	14
47	79542	84492	90093	96542	04133	13355	25094	41253	67298	42233	13
48	79620	84579	90193	96658	04272	13526	25320	41581	67897	45709	12
49	79698	84667	90293	96774	04411	13699	25546	41911	68505	49488	11
50	0.79777	84755	90394	96891	1.04550	1.13872	1.25774	1.42243	1.69121	2.53627	10
51	79855	84843	90494	97008	04690	14045	26003	42579	69745	58203	9
52	79933	84931	90595	97126	04830	14220	26233	42916	70379	63318	8
53	80012	85020	90696	97243	04971	14395	26465	43257	71023	69118	7
54	80091	85109	90798	97361	05113	14571	26697	43600	71676	75812	6
55	0.80170	85197	90899	97480	1.05254	1.14748	1.26931	1.43946	1.72339	2.83730	5
56	80249	85286	91001	97598	05397	14925	27166	44295	73012	93121	4
57	80328	85376	91103	97717	05539	15103	27403	44646	73696	3.05915	3
58	80408	85465	91205	97837	05683	15282	27640	45001	74391	23524	2
59	80487	85555	91308	97957	05826	15461	27880	45358	75097	53627	1
60	80567	85644	91411	98077	05970	15642	28120	45718	75814		0
	9°	8°	7°	6°	5°	4°	3°	2°	1°	0°	M.
	POLAR DISTANCE.								COSECANTS.		

TABLE XII.

COSINES
INDEX +5

LOGARITHMS of the HALF SUM and DIFFERENCE.

M.	HALF SUM. 89°	88°	87°	86°	85°	84°	83°	82°	81°	80°	
0	3.24186	3.54282	3.71880	3.84358	3.94030	4.01923	4.08589	14356	19433	23967	60
1	23456	53919	71638	84177	93885	01803	08486	14266	19353	23895	59
2	22713	53552	71395	83996	93740	01682	08383	14175	19273	23823	58
3	21958	53183	71151	83813	93594	01561	08280	14085	19193	23752	57
4	21189	52810	70905	83630	93448	01440	08176	13994	19113	23679	56
5	3.20407	3.52434	3.70658	3.83446	3.93301	4.01318	4.08072	13904	19033	23607	55
6	19610	52055	70409	83261	93154	01196	07968	13813	18952	23535	54
7	18799	51673	70159	83075	93007	01074	07863	13722	18871	23462	53
8	17971	51287	69907	82888	92859	00951	07758	13630	18790	23390	52
9	17128	50897	69654	82701	92710	00828	07653	13539	18709	23317	51
10	3.16268	3.50505	3.69400	3.82513	3.92561	4.00704	4.07548	13447	18628	23244	50
11	15391	50108	69144	82324	92411	00581	07442	13355	18547	23171	49
12	14495	49708	68886	82134	92261	00456	07337	13263	18465	23098	48
13	13581	49304	68627	81944	92110	00332	07231	13171	18383	23025	47
14	12647	48896	68367	81752	91959	00207	07124	13078	18302	22952	46
15	3.11693	3.48485	3.68104	3.81560	3.91807	4.00082	4.07018	12985	18220	22878	45
16	10717	48069	67841	81367	91655	3.99956	06911	12892	18137	22805	44
17	09718	47650	67575	81173	91502	99830	06804	12799	18055	22731	43
18	08696	47226	67308	80978	91349	99704	06696	12706	17973	22657	42
19	07650	46799	67039	80782	91195	99577	06589	12612	17890	22583	41
20	3.06578	3.46367	3.66769	3.80585	3.91040	3.99450	4.06481	12519	17807	22509	40
21	05478	45930	66497	80388	90885	99322	06372	12425	17724	22435	39
22	04350	45489	66223	80189	90730	99194	06264	12331	17641	22361	38
23	03192	45044	65947	79990	90574	99066	06155	12236	17558	22286	37
24	02002	44594	65670	79789	90417	98937	06046	12142	17474	22211	36
25	3.00779	3.44139	3.65391	3.79588	3.90260	3.98808	4.05937	12047	17391	22137	35
26	2.99520	43680	65110	79386	90102	98679	05827	11952	17307	22062	34
27	98223	43216	64827	79183	89943	98549	05717	11857	17223	21987	33
28	96887	42746	64543	78979	89784	98419	05607	11761	17139	21912	32
29	95508	42272	64256	78774	89625	98288	05497	11666	17055	21836	31
30	2 94084	3.41792	3.63968	3.78568	3.89464	3.98157	4.05386	11570	16970	21761	30
31	92612	41307	63678	78361	89304	98026	05275	11474	16886	21685	29
32	91088	40816	63385	78152	89142	97894	05164	11377	16801	21610	28
33	89509	40320	63091	77943	88980	97762	05052	11281	16716	21534	27
34	87870	39818	62795	77733	88817	97629	04940	11184	16631	21458	26
35	2.86166	3.39310	3.62497	3.77522	3.88654	3.97496	4.04828	11087	16545	21382	25
36	84393	38796	62196	77310	88490	97363	04715	10990	16460	21306	24
37	82545	38276	61894	77097	88326	97229	04603	10893	16374	21229	23
38	80615	37750	61589	76883	88161	97095	04490	10795	16289	21153	22
39	78594	37217	61282	76667	87995	96960	04376	10697	16203	21076	21
40	2.76475	3.36678	3.60973	3.76451	3.87829	3.96825	4.04262	10599	16116	20999	20
41	74248	36132	60662	76234	87661	96689	04149	10501	16030	20922	19
42	71900	35578	60349	76015	87494	96553	04034	10402	15944	20845	18
43	69417	35018	60033	75796	87325	96417	03920	10304	15857	20768	17
44	66784	34450	59715	75575	87156	96280	03805	10205	15770	20691	16
45	2.63982	3.33875	3.59395	3.75353	3.86987	3.96143	4.03690	10106	15683	20613	15
46	60985	33292	59072	75130	86816	96005	03574	10006	15596	20535	14
47	57767	32702	58747	74906	86645	95867	03458	09907	15508	20458	13
48	54291	32103	58419	74680	86474	95728	03342	09807	15421	20380	12
49	50512	31495	58089	74454	86301	95589	03226	09707	15333	20302	11
50	2.46373	3.30879	3.57757	3.74226	3.86128	3.95450	4.03109	09606	15245	20223	10
51	41797	30255	57421	73997	85955	95310	02992	09506	15157	20145	9
52	36682	29621	57084	73767	85780	95170	02874	09405	15069	20067	8
53	30882	28977	56743	73535	85605	95029	02757	09304	14980	19988	7
54	24188	28321	56400	73303	85429	94887	02639	09202	14891	19909	6
55	2.16270	3.27661	3.56054	3.73069	3.85252	3.94746	4.02520	09101	14803	19830	5
56	06579	26988	55705	72834	85075	94603	02402	08999	14714	19751	4
57	1.94085	26304	55354	72597	84897	94461	02283	08897	14624	19672	3
58	76476	25609	54999	72360	84718	94317	02163	08795	14535	19592	2
59	46373	24903	54642	72120	84539	94174	02043	08692	14445	19513	1
60	00000	24186	54282	71880	84358	94030	01923	08589	14356	19433	0
	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	M.
	INDEX +5				DIFFERENCE.				SINES.		

TABLE XII.

Logarithms of the Half Sum and Difference.

	COSINES.				HALF SUM.						
M.	° 79	° 78	° 77	° 76	° 75	° 74	° 73	° 72	° 71	° 70	
0	4.28060	31788	35209	38368	41300	44034	46594	48998	51264	53405	60
1	27995	31728	35154	38317	41252	43990	46552	48959	51227	53370	59
2	27930	31669	35099	38266	41205	43946	46511	48920	51191	53336	58
3	27864	31609	35044	38215	41158	43901	46469	48881	51154	53301	57
4	27799	31549	34989	38164	41110	43857	46428	48842	51117	53266	56
5	4.27734	31490	34934	38113	41063	43813	46386	48803	51080	53231	55
6	27668	31430	34879	38062	41016	43769	46345	48764	51043	53196	54
7	27602	31370	34824	38011	40968	43724	46303	48725	51007	53161	53
8	27537	31310	34769	37960	40921	43680	46262	48686	50970	53126	52
9	27471	31250	34713	37909	40873	43635	46220	48647	50933	53092	51
10	4.27405	31189	34658	37858	40825	43591	46178	48607	50896	53056	50
11	27339	31129	34602	37806	40778	43546	46136	48568	50858	53021	49
12	27273	31068	34547	37755	40730	43502	46095	48529	50821	52986	48
13	27206	31008	34491	37703	40682	43457	46053	48490	50784	52951	47
14	27140	30947	34436	37652	40634	43412	46011	48450	50747	52916	46
15	4.27073	30887	34380	37600	40586	43367	45969	48411	50710	52881	45
16	27007	30826	34324	37549	40538	43323	45927	48371	50673	52846	44
17	26940	30765	34268	37497	40490	43278	45885	48332	50635	52811	43
18	26873	30704	34212	37445	40442	43233	45843	48292	50598	52775	42
19	26806	30643	34156	37393	40394	43188	45801	48252	50561	52740	41
20	4.26739	30582	34100	37341	40346	43143	45758	48213	50523	52705	40
21	26672	30521	34043	37289	40297	43098	45716	48173	50486	52669	39
22	26605	30459	33987	37237	40249	43053	45674	48133	50449	52634	38
23	26538	30398	33931	37185	40200	43008	45632	48094	50411	52598	37
24	26470	30336	33874	37133	40152	42962	45589	48054	50374	52563	36
25	4.26403	30275	33818	37081	40103	42917	45547	48014	50336	52527	35
26	26335	30213	33761	37028	40055	42872	45504	47974	50298	52492	34
27	26267	30151	33704	36976	40006	42826	45462	47934	50261	52456	33
28	26199	30090	33647	36924	39958	42781	45419	47894	50223	52421	32
29	26131	30028	33591	36871	39909	42735	45377	47854	50185	52385	31
30	4.26063	29966	33534	36819	39860	42690	45334	47814	50148	52350	30
31	25995	29903	33477	36766	39811	42644	45292	47774	50110	52314	29
32	25927	29841	33420	36713	39762	42599	45249	47734	50072	52278	28
33	25858	29779	33362	36660	39713	42553	45206	47694	50034	52242	27
34	25790	29716	33305	36608	39664	42507	45163	47654	49996	52207	26
35	4.25721	29654	33248	36555	39615	42461	45120	47613	49958	52171	25
36	25652	29591	33190	36502	39566	42416	45077	47573	49920	52135	24
37	25583	29529	33133	36449	39517	42370	45035	47533	49882	52099	23
38	25514	29466	33075	36395	39467	42324	44992	47492	49844	52063	22
39	25445	29403	33018	36342	39418	42278	44948	47452	49806	52027	21
40	4.25376	29340	32960	36289	39369	42232	44905	47411	49768	51991	20
41	25307	29277	32902	36236	39319	42186	44862	47371	49730	51955	19
42	25237	29214	32844	36182	39270	42140	44819	47330	49692	51919	18
43	25168	29150	32786	36129	39220	42093	44776	47290	49654	51883	17
44	25098	29087	32728	36075	39170	42047	44733	47249	49615	51847	16
45	4.25028	29024	32670	36022	39121	42001	44689	47209	49577	51811	15
46	24958	28960	32612	35968	39071	41954	44646	47168	49539	51774	14
47	24888	28896	32553	35914	39021	41908	44602	47127	49500	51738	13
48	24818	28833	32495	35860	38971	41861	44559	47086	49462	51702	12
49	24748	28769	32437	35806	38921	41815	44516	47045	49424	51666	11
50	4.24677	28705	32378	35752	38871	41768	44472	47005	49385	51629	10
51	24607	28641	32319	35698	38821	41722	44428	46964	49347	51593	9
52	24536	28577	32261	35644	38771	41675	44385	46923	49308	51557	8
53	24466	28511	32202	35590	38721	41628	44341	46882	49269	51520	7
54	24395	28448	32143	35536	38670	41582	44297	46841	49231	51484	6
55	4.24324	28384	32084	35481	38620	41535	44253	46800	49192	51447	5
56	24253	28319	32025	35427	38570	41488	44210	46758	49153	51411	4
57	24181	28254	31966	35373	38519	41441	44166	46717	49115	51374	3
58	24110	28190	31907	35318	38469	41394	44122	46676	49076	51338	2
59	24039	28125	31847	35263	38418	41347	44078	46635	49037	51301	1
60	23967	28060	31788	35209	38368	41300	44034	46594	48998	51264	0
	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	M.
	DIFFERENCE.								SINES.		

TABLE XII.

Logarithms of the Half Sum and Difference

M.	COSINES. 69°	68°	67°	66°	HALF SUM. 65°	64°	63°	62°	61°	60°	
0	4.55433	57358	59188	60931	62595	64184	65705	67161	68557	69897	60
1	55406	57326	59158	60903	62568	64158	65680	67137	68534	69875	59
2	55367	57295	59128	60875	62541	64132	65655	67113	68512	69853	58
3	55334	57264	59098	60846	62513	64106	65630	67090	68489	69831	57
4	55301	57232	59069	60818	62486	64080	65605	67066	68466	69809	56
5	4.55268	57201	59039	60789	62459	64054	65580	67042	68443	69787	55
6	55235	57169	59009	60761	62432	64028	65556	67018	68420	69765	54
7	55202	57138	58979	60732	62405	64002	65531	66994	68397	69743	53
8	55169	57107	58949	60704	62377	63976	65506	66970	68374	69721	52
9	55136	57075	58919	60675	62350	63950	65481	66946	68351	69699	51
10	4.55102	57044	58889	60646	62323	63924	65456	66922	68328	69677	50
11	55069	57012	58859	60618	62296	63898	65431	66899	68305	69655	49
12	55036	56980	58829	60589	62268	63872	65406	66875	68282	69633	48
13	55003	56949	58799	60561	62241	63846	65381	66851	68260	69611	47
14	54969	56917	58769	60532	62214	63820	65356	66827	68237	69589	46
15	4.54936	56886	58739	60503	62186	63794	65331	66803	68213	69567	45
16	54903	56854	58709	60474	62159	63767	65306	66779	68190	69545	44
17	54869	56822	58678	60446	62131	63741	65281	66755	68167	69523	43
18	54836	56790	58648	60417	62104	63715	65255	66731	68144	69501	42
19	54802	56759	58618	60388	62076	63689	65230	66706	68121	69479	41
20	4.54769	56727	58588	60359	62049	63662	65205	66682	68098	69456	40
21	54735	56695	58557	60331	62021	63636	65180	66658	68075	69434	39
22	54702	56663	58527	60302	61994	63610	65155	66634	68052	69412	38
23	54668	56631	58497	60273	61966	63583	65130	66610	68029	69390	37
24	54635	56599	58467	60244	61939	63557	65104	66586	68006	69368	36
25	4.54601	56568	58436	60215	61911	63531	65079	66562	67982	69345	35
26	54567	56536	58406	60186	61883	63504	65054	66537	67959	69323	34
27	54534	56504	58375	60157	61856	63478	65029	66513	67936	69301	33
28	54500	56472	58345	60128	61828	63451	65003	66489	67913	69279	32
29	54466	56440	58314	60099	61800	63425	64978	66465	67890	69256	31
30	4.54433	56408	58284	60070	61773	63398	64953	66441	67866	69234	30
31	54399	56375	58253	60041	61745	63372	64927	66416	67843	69212	29
32	54365	56343	58223	60012	61717	63345	64902	66392	67820	69189	28
33	54331	56311	58192	59983	61689	63319	64877	66368	67796	69167	27
34	54297	56279	58162	59954	61662	63292	64851	66343	67773	69144	26
35	4.54263	56247	58131	59924	61634	63266	64826	66319	67750	69122	25
36	54229	56215	58101	59895	61606	63239	64800	66295	67726	69100	24
37	54195	56183	58070	59866	61578	63213	64775	66270	67703	69077	23
38	54161	56150	58039	59837	61550	63186	64749	66246	67680	69055	22
39	54127	56118	58008	59808	61522	63159	64724	66221	67656	69032	21
40	4.54093	56085	57978	59778	61494	63133	64698	66197	67633	69010	20
41	54059	56053	57947	59749	61466	63106	64673	66173	67609	68987	19
42	54025	56021	57916	59720	61438	63079	64647	66148	67586	68965	18
43	53991	55988	57885	59690	61410	63052	64622	66124	67562	68942	17
44	53957	55956	57855	59661	61382	63026	64596	66099	67539	68920	16
45	4.53922	55923	57824	59632	61354	62999	64571	66075	67515	68897	15
46	53888	55891	57793	59602	61326	62972	64545	66050	67492	68875	14
47	53854	55858	57762	59573	61298	62945	64519	66025	67468	68852	13
48	53819	55826	57731	59543	61270	62918	64494	66001	67445	68829	12
49	53785	55793	57700	59514	61242	62892	64468	65976	67421	68807	11
50	4.53751	55761	57669	59484	61214	62865	64442	65952	67398	68784	10
51	53716	55728	57638	59455	61186	62838	64417	65927	67374	68762	9
52	53682	55695	57607	59425	61158	62811	64391	65902	67350	68739	8
53	53647	55663	57576	59396	61129	62784	64365	65878	67327	68716	7
54	53613	55630	57545	59366	61101	62757	64339	65853	67303	68694	6
55	4.53578	55597	57514	59336	61073	62730	64313	65828	67280	68671	5
56	53544	55564	57482	59307	61045	62703	64288	65804	67256	68648	4
57	53509	55532	57451	59277	61016	62676	64262	65779	67232	68625	3
58	53475	55499	57420	59247	60988	62649	64236	65754	67208	68603	2
59	53440	55466	57389	59218	60960	62622	64210	65729	67185	68580	1
60	53405	55433	57358	59188	60931	62595	64184	65705	67161	68557	0
	20°	21°	22°	23°	24°	25°	26°	27°	28°	29°	M.
	DIFFERENCE.								SINES.		

TABLE XII.

Logarithms of the Half Sum and Difference.

	COSINES.				HALF SUM.						
M.	° 59	° 58	° 57	° 56	° 55	° 54	° 53	° 52	° 51	° 50	
0	4.71184	72421	73611	74756	75859	76922	77946	78934	79887	80807	60
1	71163	72401	73591	74737	75841	76904	77930	78918	79872	80792	59
2	71142	72381	73572	74719	75823	76887	77913	78902	79856	80777	58
3	71121	72360	73552	74700	75805	76870	77896	78886	79840	80762	57
4	71100	72340	73533	74681	75787	76852	77879	78869	79825	80746	56
5	4.71079	72320	73513	74662	75769	76835	77862	78853	79809	80731	55
6	71058	72299	73494	74644	75751	76817	77846	78837	79793	80716	54
7	71036	72279	73474	74625	75733	76800	77829	78821	79778	80701	53
8	71015	72259	73455	74606	75714	76782	77812	78805	79762	80686	52
9	70994	72238	73435	74587	75696	76765	77795	78788	79746	80671	51
10	4.70973	72218	73416	74568	75678	76747	77778	78772	79731	80656	50
11	70952	72198	73396	74549	75660	76730	77761	78756	79715	80641	49
12	70931	72177	73377	74531	75642	76712	77744	78739	79699	80625	48
13	70909	72157	73357	74512	75624	76695	77727	78723	79684	80610	47
14	70888	72137	73337	74493	75605	76677	77711	78707	79668	80595	46
15	4.70867	72116	73318	74474	75587	76660	77694	78691	79652	80580	45
16	70846	72096	73298	74455	75569	76642	77677	78674	79636	80565	44
17	70824	72075	73278	74436	75551	76625	77660	78658	79621	80550	43
18	70803	72055	73259	74417	75533	76607	77643	78642	79605	80534	42
19	70782	72034	73239	74398	75514	76590	77626	78625	79589	80519	41
20	4.70761	72014	73219	74379	75496	76572	77609	78609	79573	80504	40
21	70739	71994	73200	74360	75478	76554	77592	78592	79558	80489	39
22	70718	71973	73180	74341	75459	76537	77575	78576	79542	80473	38
23	70697	71952	73160	74322	75441	76519	77558	78560	79526	80458	37
24	70675	71932	73140	74303	75423	76501	77541	78543	79510	80443	36
25	4.70654	71911	73121	74284	75405	76484	77524	78527	79494	80428	35
26	70633	71891	73101	74265	75386	76466	77507	78510	79478	80412	34
27	70611	71870	73081	74246	75368	76448	77490	78494	79463	80397	33
28	70590	71850	73061	74227	75350	76431	77473	78478	79447	80382	32
29	70568	71829	73041	74208	75331	76413	77456	78461	79431	80366	31
30	4.70547	71809	73022	74189	75313	76395	77439	78445	79415	80351	30
31	70525	71788	73002	74170	75294	76378	77422	78428	79399	80336	29
32	70504	71767	72982	74151	75276	76360	77405	78412	79383	80320	28
33	70482	71747	72962	74132	75258	76342	77387	78395	79367	80305	27
34	70461	71726	72942	74113	75239	76324	77370	78379	79351	80290	26
35	4.70439	71705	72922	74093	75221	76307	77353	78362	79335	80274	25
36	70418	71685	72902	74074	75202	76289	77336	78346	79319	80259	24
37	70396	71664	72883	74055	75184	76271	77319	78329	79304	80244	23
38	70375	71643	72863	74036	75165	76253	77302	78313	79288	80228	22
39	70353	71622	72843	74017	75147	76236	77285	78296	79272	80213	21
40	4.70332	71602	72823	73997	75128	76218	77268	78280	79256	80197	20
41	70310	71581	72803	73978	75110	76200	77250	78263	79240	80182	19
42	70288	71560	72783	73959	75091	76182	77233	78246	79224	80166	18
43	70267	71539	72763	73940	75073	76164	77216	78230	79208	80151	17
44	70245	71519	72743	73921	75054	76146	77199	78213	79192	80136	16
45	4.70224	71498	72723	73901	75036	76129	77181	78197	79176	80120	15
46	70202	71477	72703	73882	75017	76111	77164	78180	79160	80105	14
47	70180	71456	72683	73863	74999	76093	77147	78163	79144	80089	13
48	70159	71435	72663	73843	74980	76075	77130	78147	79128	80074	12
49	70137	71414	72643	73824	74961	76057	77112	78130	79111	80058	11
50	4.70115	71393	72622	73805	74943	76039	77095	78113	79095	80043	10
51	70093	71373	72602	73785	74924	76021	77078	78097	79079	80027	9
52	70072	71352	72582	73766	74906	76003	77061	78080	79063	80012	8
53	70050	71331	72562	73747	74887	75985	77043	78063	79047	79996	7
54	70028	71310	72542	73727	74868	75967	77026	78047	79031	79981	6
55	4.70006	71289	72522	73708	74850	75949	77009	78030	79015	79965	5
56	69984	71268	72502	73689	74831	75931	76991	78013	78999	79950	4
57	69963	71247	72482	73669	74812	75913	76974	77997	78983	79934	3
58	69941	71226	72461	73650	74794	75895	76957	77980	78967	79918	2
59	69919	71205	72441	73630	74775	75877	76939	77963	78950	79903	1
60	69897	71184	72421	73611	74756	75859	76922	77946	78934	79887	0
	30°	31°	32°	33°	34°	35°	36°	37°	38°	39°	M.
	DIFFERENCE.								SINES.		

TABLE XII.

Logarithms of the Half Sum and Difference.

M.	COSINES. 49°	48°	47°	46°	HALF SUM. 45°	44°	43°	42°	41°	40°	
0	4.81694	82551	83378	84177	84949	85693	86413	87107	87778	88425	60
1	81680	82537	83365	84164	84936	85681	86401	87096	87767	88415	59
2	81665	82523	83351	84151	84923	85669	86389	87085	87756	88404	58
3	81651	82509	83338	84138	84911	85657	86377	87073	87745	88394	57
4	81636	82495	83324	84125	84898	85645	86366	87062	87734	88383	56
5	4.81622	82481	83311	84112	84885	85632	86354	87050	87723	88372	55
6	81607	82467	83297	84099	84873	85620	86342	87039	87712	88362	54
7	81592	82453	83283	84085	84860	85608	86330	87028	87701	88351	53
8	81578	82439	83270	84072	84847	85596	86318	87016	87690	88340	52
9	81563	82424	83256	84059	84835	85583	86306	87005	87679	88330	51
10	4.81549	82410	83242	84046	84822	85571	86295	86993	87668	88319	50
11	81534	82396	83229	84033	84809	85559	86283	86982	87657	88308	49
12	81519	82382	83215	84020	84796	85547	86271	86970	87646	88298	48
13	81505	82368	83202	84006	84784	85534	86259	86959	87635	88287	47
14	81490	82354	83188	83993	84771	85522	86247	86947	87624	88276	46
15	4.81475	82340	83174	83980	84758	85510	86235	86936	87613	88266	45
16	81461	82326	83161	83967	84745	85497	86223	86924	87601	88255	44
17	81446	82311	83147	83954	84733	85485	86211	86913	87590	88244	43
18	81431	82297	83133	83940	84720	85473	86200	86902	87579	88234	42
19	81417	82283	83120	83927	84707	85460	86188	86890	87568	88223	41
20	4.81402	82269	83106	83914	84694	85448	86176	86879	87557	88212	40
21	81387	82255	83092	83901	84682	85436	86164	86867	87546	88201	39
22	81372	82240	83078	83887	84669	85423	86152	86855	87535	88191	38
23	81358	82226	83065	83874	84656	85411	86140	86844	87524	88180	37
24	81343	82212	83051	83861	84643	85399	86128	86832	87513	88169	36
25	4.81328	82198	83037	83848	84630	85386	86116	86821	87501	88158	35
26	81314	82184	83023	83834	84618	85374	86104	86809	87490	88148	34
27	81299	82169	83010	83821	84605	85361	86092	86798	87479	88137	33
28	81284	82155	82996	83808	84592	85349	86080	86786	87468	88126	32
29	81269	82141	82982	83795	84579	85337	86068	86775	87457	88115	31
30	4.81254	82126	82968	83781	84566	85324	86056	86763	87446	88105	30
31	81240	82112	82955	83768	84553	85312	86044	86752	87434	88094	29
32	81225	82098	82941	83755	84540	85299	86032	86740	87423	88083	28
33	81210	82084	82927	83741	84528	85287	86020	86728	87412	88072	27
34	81195	82069	82913	83728	84515	85274	86008	86717	87401	88061	26
35	4.81180	82055	82899	83715	84502	85262	85996	86705	87390	88051	25
36	81166	82041	82885	83701	84489	85250	85984	86694	87378	88040	24
37	81151	82026	82872	83688	84476	85237	85972	86682	87367	88029	23
38	81136	82012	82858	83674	84463	85225	85960	86670	87356	88018	22
39	81121	81998	82844	83661	84450	85212	85948	86659	87345	88007	21
40	4.81106	81983	82830	83648	84437	85200	85936	86647	87334	87996	20
41	81091	81969	82816	83634	84424	85187	85924	86635	87322	87985	19
42	81076	81955	82802	83621	84411	85175	85912	86624	87311	87975	18
43	81061	81940	82788	83608	84398	85162	85900	86612	87300	87964	17
44	81047	81926	82775	83594	84385	85150	85888	86600	87288	87953	16
45	4.81032	81911	82761	83581	84373	85137	85876	86589	87277	87942	15
46	81017	81897	82747	83567	84360	85125	85864	86577	87266	87931	14
47	81002	81882	82733	83554	84347	85112	85851	86565	87255	87920	13
48	80987	81868	82719	83540	84334	85100	85839	86554	87243	87909	12
49	80972	81854	82705	83527	84321	85087	85827	86542	87232	87898	11
50	4.80957	81839	82691	83513	84308	85074	85815	86530	87221	87887	10
51	80942	81825	82677	83500	84295	85062	85803	86518	87209	87877	9
52	80927	81810	82663	83486	84282	85049	85791	86507	87198	87866	8
53	80912	81796	82649	83473	84269	85037	85779	86495	87187	87855	7
54	80897	81781	82635	83459	84255	85024	85766	86483	87175	87844	6
55	4.80882	81767	82621	83446	84242	85012	85754	86472	87164	87833	5
56	80867	81752	82607	83432	84229	84999	85742	86460	87153	87822	4
57	80852	81738	82593	83419	84216	84986	85730	86448	87141	87811	3
58	80837	81723	82579	83405	84203	84974	85718	86436	87130	87800	2
59	80822	81709	82565	83392	84190	84961	85706	86425	87119	87789	1
60	80807	81694	82551	83378	84177	84949	85693	86413	87107	87778	0
	40°	41°	42°	43°	44°	45°	46°	47°	48°	49°	M.
	DIFFERENCE.								SINES.		

TABLE XII.

Logarithms of the Half Sum and Difference.

	COSINES.				HALF SUM.						
M.	° 39	° 38	° 37	° 36	° 35	° 34	° 33	° 32	° 31	° 30	
0	4.89050	89653	90235	90796	91336	91857	92359	92842	93307	93753	60
1	89040	89643	90225	90787	91328	91849	92351	92834	93299	93746	59
2	89030	89633	90216	90777	91319	91840	92343	92826	93291	93738	58
3	89020	89624	90206	90768	91310	91832	92334	92818	93284	93731	57
4	89009	89614	90197	90759	91301	91823	92326	92810	93276	93724	56
5	4.88999	89604	90187	90750	91292	91815	92318	92803	93269	93717	55
6	88989	89594	90178	90741	91283	91806	92310	92795	93261	93709	54
7	88978	89584	90168	90731	91274	91798	92302	92787	93253	93702	53
8	88968	89574	90159	90722	91266	91789	92293	92779	93246	93695	52
9	88958	89564	90149	90713	91257	91781	92285	92771	93238	93687	51
10	4.88948	89554	90139	90704	91248	91772	92277	92763	93230	93680	50
11	88937	89544	90130	90694	91239	91763	92269	92755	93223	93673	49
12	88927	89534	90120	90685	91230	91755	92260	92747	93215	93665	48
13	88917	89524	90111	90676	91221	91746	92252	92739	93207	93658	47
14	88906	89514	90101	90667	91212	91738	92244	92731	93200	93650	46
15	4.88896	89504	90091	90657	91203	91729	92235	92723	93192	93643	45
16	88886	89495	90082	90648	91194	91720	92227	92715	93184	93636	44
17	88875	89485	90072	90639	91185	91712	92219	92707	93177	93628	43
18	88865	89475	90063	90630	91176	91703	92211	92699	93169	93621	42
19	88855	89465	90053	90620	91167	91695	92202	92691	93161	93614	41
20	4.88844	89455	90043	90611	91158	91686	92194	92683	93154	93606	40
21	88834	89445	90034	90602	91149	91677	92186	92675	93146	93599	39
22	88824	89435	90024	90592	91141	91669	92177	92667	93138	93591	38
23	88813	89425	90014	90583	91132	91660	92169	92659	93131	93584	37
24	88803	89415	90005	90574	91123	91651	92161	92651	93123	93577	36
25	4.88793	89405	89995	90565	91114	91643	92152	92643	93115	93569	35
26	88782	89395	89985	90555	91105	91634	92144	92635	93108	93562	34
27	88772	89385	89976	90546	91096	91625	92136	92627	93100	93554	33
28	88761	89375	89966	90537	91087	91617	92127	92619	93092	93547	32
29	88751	89364	89956	90527	91078	91608	92119	92611	93084	93539	31
30	4.88741	89354	89947	90518	91069	91599	92111	92603	93077	93532	30
31	88730	89344	89937	90509	91060	91591	92102	92595	93069	93525	29
32	88720	89334	89927	90499	91051	91582	92094	92587	93061	93517	28
33	88709	89324	89918	90490	91042	91573	92086	92579	93053	93510	27
34	88699	89314	89908	90480	91033	91565	92077	92571	93046	93502	26
35	4.88688	89304	89898	90471	91023	91556	92069	92563	93038	93495	25
36	88678	89294	89888	90462	91014	91547	92060	92555	93030	93487	24
37	88668	89284	89879	90452	91005	91538	92052	92546	93022	93480	23
38	88657	89274	89869	90443	90996	91530	92044	92538	93014	93472	22
39	88647	89264	89859	90434	90987	91521	92035	92530	93007	93465	21
40	4.88636	89254	89849	90424	90978	91512	92027	92522	92999	93457	20
41	88626	89244	89840	90415	90969	91504	92018	92514	92991	93450	19
42	88615	89233	89830	90405	90960	91495	92010	92506	92983	93442	18
43	88605	89223	89820	90396	90951	91486	92002	92498	92976	93435	17
44	88594	89213	89810	90386	90942	91477	91993	92490	92968	93427	16
45	4.88584	89203	89801	90377	90933	91469	91985	92482	92960	93420	15
46	88573	89193	89791	90368	90924	91460	91976	92473	92952	93412	14
47	88563	89183	89781	90358	90915	91451	91968	92465	92944	93405	13
48	88552	89173	89771	90349	90906	91442	91959	92457	92936	93397	12
49	88542	89162	89761	90339	90896	91433	91951	92449	92929	93390	11
50	4.88531	89152	89752	90330	90887	91425	91942	92441	92921	93382	10
51	88521	89142	89742	90320	90878	91416	91934	92433	92913	93375	9
52	88510	89132	89732	90311	90869	91407	91925	92425	92905	93367	8
53	88499	89122	89722	90301	90860	91398	91917	92416	92897	93360	7
54	88489	89112	89712	90292	90851	91389	91908	92408	92889	93352	6
55	4.88478	89101	89702	90282	90842	91381	91900	92400	92881	93344	5
56	88468	89091	89693	90273	90832	91372	91891	92392	92874	93337	4
57	88457	89081	89683	90263	90823	91363	91883	92384	92866	93329	3
58	88447	89071	89673	90254	90814	91354	91874	92376	92858	93322	2
59	88436	89060	89663	90244	90805	91345	91866	92367	92850	93314	1
60	88425	89050	89653	90235	90796	91336	91857	92359	92842	93307	0
	50°	51°	52°	53°	54°	55°	56°	57°	58°	59°	M.
	DIFFERENCE.								SINES.		

TABLE XII.

Logarithms of the Half Sum and Difference.

M.	COSINES. HALF SUM. 29°	28°	27°	26°	25°	24°	23°	22°	21°	20°	
0	4.94182	94593	94988	95366	95728	96073	96403	96717	97015	97299	60
1	94175	94587	94982	95360	95722	96067	96397	96711	97010	97294	59
2	94168	94580	94975	95354	95716	96062	96392	96706	97005	97289	58
3	94161	94573	94969	95348	95710	96056	96387	96701	97001	97285	57
4	94154	94567	94962	95341	95704	96050	96381	96696	96996	97280	56
5	4.94147	94560	94956	95335	95698	96045	96376	96691	96991	97276	55
6	94140	94553	94949	95329	95692	96039	96370	96686	96986	97271	54
7	94133	94546	94943	95323	95686	96034	96365	96681	96981	97266	53
8	94126	94540	94936	95317	95680	96028	96360	96676	96976	97262	52
9	94119	94533	94930	95310	95674	96022	96354	96670	96971	97257	51
10	4.94112	94526	94923	95304	95668	96017	96349	96665	96966	97252	50
11	94105	94519	94917	95298	95663	96011	96343	96660	96962	97248	49
12	94098	94513	94911	95292	95657	96005	96338	96655	96957	97243	48
13	94090	94506	94904	95286	95651	96000	96333	96650	96952	97238	47
14	94083	94499	94898	95279	95645	95994	96327	96645	96947	97234	46
15	4.94076	94492	94891	95273	95639	95988	96322	96640	96942	97229	45
16	94069	94485	94884	95267	95633	95982	96316	96634	96937	97224	44
17	94062	94479	94878	95261	95627	95977	96311	96629	96932	97220	43
18	94055	94472	94871	95254	95621	95971	96305	96624	96927	97215	42
19	94048	94465	94865	95248	95615	95965	96300	96619	96922	97210	41
20	4.94041	94458	94858	95242	95609	95960	96294	96614	96917	97206	40
21	94034	94451	94852	95236	95603	95954	96289	96608	96912	97201	39
22	94027	94445	94845	95229	95597	95948	96284	96603	96907	97196	38
23	94020	94438	94839	95223	95591	95942	96278	96598	96903	97192	37
24	94012	94431	94832	95217	95585	95937	96273	96593	96898	97187	36
25	4.94005	94424	94826	95211	95579	95931	96267	96588	96893	97182	35
26	93998	94417	94819	95204	95573	95925	96262	96582	96888	97178	34
27	93991	94410	94813	95198	95567	95920	96256	96577	96883	97173	33
28	93984	94404	94806	95192	95561	95914	96251	96572	96878	97168	32
29	93977	94397	94799	95185	95555	95908	96245	96567	96873	97163	31
30	4.93970	94390	94793	95179	95549	95902	96240	96562	96868	97159	30
31	93963	94383	94786	95173	95543	95897	96234	96556	96863	97154	29
32	93955	94376	94780	95167	95537	95891	96229	96551	96858	97149	28
33	93948	94369	94773	95160	95531	95885	96223	96546	96853	97145	27
34	93941	94362	94767	95154	95525	95879	96218	96541	96848	97140	26
35	4.93934	94355	94760	95148	95519	95873	96212	96535	96843	97135	25
36	93927	94349	94753	95141	95513	95868	96207	96530	96838	97130	24
37	93920	94342	94747	95135	95507	95862	96201	96525	96833	97126	23
38	93912	94335	94740	95129	95500	95856	96196	96520	96828	97121	22
39	93905	94328	94734	95122	95494	95850	96190	96514	96823	97116	21
40	4.93898	94321	94727	95116	95488	95844	96185	96509	96818	97111	20
41	93891	94314	94720	95110	95482	95839	96179	96504	96813	97107	19
42	93884	94307	94714	95103	95476	95833	96174	96498	96808	97102	18
43	93876	94300	94707	95097	95470	95827	96168	96493	96803	97097	17
44	93869	94293	94700	95090	95464	95821	96162	96488	96798	97092	16
45	4.93862	94286	94694	95084	95458	95815	96157	96483	96793	97087	15
46	93855	94279	94687	95078	95452	95810	96151	96477	96788	97083	14
47	93847	94273	94680	95071	95446	95804	96146	96472	96783	97078	13
48	93840	94266	94674	95065	95440	95798	96140	96467	96778	97073	12
49	93833	94259	94667	95059	95434	95792	96135	96461	96772	97068	11
50	4.93826	94252	94660	95052	95427	95786	96129	96456	96767	97063	10
51	93819	94245	94654	95046	95421	95780	96123	96451	96762	97059	9
52	93811	94238	94647	95039	95415	95775	96118	96445	96757	97054	8
53	93804	94231	94640	95033	95409	95769	96112	96440	96752	97049	7
54	93797	94224	94634	95027	95403	95763	96107	96435	96747	97044	6
55	4.93789	94217	94627	95020	95397	95757	96101	96429	96742	97039	5
56	93782	94210	94620	95014	95391	95751	96095	96424	96737	97035	4
57	93775	94203	94614	95007	95384	95745	96090	96419	96732	97030	3
58	93768	94196	94607	95001	95378	95739	96084	96413	96727	97025	2
59	93760	94189	94600	94995	95372	95733	96079	96408	96722	97020	1
60	93753	94182	94593	94988	95366	95728	96073	96403	96717	97015	0
	60°	61°	62°	63°	64°	65°	66°	67°	68°	69°	M.
	DIFFERENCE.								SINES.		

TABLE XII.

Logarithms of the Half Sum and Difference.

M.	COSINES. HALF SUM. 19°	18°	17°	16°	15°	14°	13°	12°	11°	10°	
0	4.97567	97821	98060	98284	98494	98690	98872	99040	99195	99325	60
1	97563	97817	98056	98281	98491	98687	98869	99038	99192	99333	59
2	97558	97812	98052	98277	98488	98684	98867	99035	99190	99331	58
3	97554	97808	98048	98273	98484	98681	98864	99032	99187	99328	57
4	97550	97804	98044	98270	98481	98678	98861	99030	99185	99326	56
5	4.97545	97800	98040	98266	98477	98675	98858	99027	99182	99324	55
6	97541	97796	98036	98262	98474	98671	98855	99024	99180	99322	54
7	97536	97792	98032	98259	98471	98668	98852	99022	99177	99319	53
8	97532	97788	98029	98255	98467	98665	98849	99019	99175	99317	52
9	97528	97784	98025	98251	98464	98662	98846	99016	99172	99315	51
10	4.97523	97779	98021	98248	98460	98659	98843	99013	99170	99313	50
11	97519	97775	98017	98244	98457	98656	98840	99011	99167	99310	49
12	97515	97771	98013	98240	98453	98652	98837	99008	99165	99308	48
13	97510	97767	98009	98237	98450	98649	98834	99005	99162	99306	47
14	97506	97763	98005	98233	98447	98646	98831	99002	99160	99304	46
15	4.97501	97759	98001	98229	98443	98643	98828	99000	99157	99301	45
16	97497	97754	97997	98226	98440	98640	98825	98997	99155	99299	44
17	97492	97750	97993	98222	98436	98636	98822	98994	99152	99297	43
18	97488	97746	97989	98218	98433	98633	98819	98991	99150	99294	42
19	97484	97742	97986	98215	98429	98630	98816	98989	99147	99292	41
20	4.97479	97738	97982	98211	98426	98627	98813	98986	99145	99290	40
21	97475	97734	97978	98207	98422	98623	98810	98983	99142	99288	39
22	97470	97729	97974	98204	98419	98620	98807	98980	99140	99285	38
23	97466	97725	97970	98200	98415	98617	98804	98978	99137	99283	37
24	97461	97721	97966	98196	98412	98614	98801	98975	99135	99281	36
25	4.97457	97717	97962	98192	98409	98610	98798	98972	99132	99278	35
26	97453	97713	97958	98189	98405	98607	98795	98969	99130	99276	34
27	97448	97708	97954	98185	98402	98604	98792	98967	99127	99274	33
28	97444	97704	97950	98181	98398	98601	98789	98964	99124	99271	32
29	97439	97700	97946	98177	98395	98597	98786	98961	99122	99269	31
30	4.97435	97696	97942	98174	98391	98594	98783	98958	99119	99267	30
31	97430	97691	97938	98170	98388	98591	98780	98955	99117	99264	29
32	97426	97687	97934	98166	98384	98588	98777	98953	99114	99262	28
33	97421	97683	97930	98162	98381	98584	98774	98950	99112	99260	27
34	97417	97679	97926	98159	98377	98581	98771	98947	99109	99257	26
35	4.97412	97674	97922	98155	98373	98578	98768	98944	99106	99255	25
36	97408	97670	97918	98151	98370	98574	98765	98941	99104	99252	24
37	97403	97666	97914	98147	98366	98571	98762	98938	99101	99250	23
38	97399	97662	97910	98144	98363	98568	98759	98936	99099	99248	22
39	97394	97657	97906	98140	98359	98565	98756	98933	99096	99245	21
40	4.97390	97653	97902	98136	98356	98561	98753	98930	99093	99243	20
41	97385	97649	97898	98132	98352	98558	98750	98927	99091	99241	19
42	97381	97645	97894	98129	98349	98555	98746	98924	99088	99238	18
43	97376	97640	97890	98125	98345	98551	98743	98921	99086	99236	17
44	97372	97636	97886	98121	98342	98548	98740	98919	99083	99233	16
45	4.97367	97632	97882	98117	98338	98545	98737	98916	99080	99231	15
46	97363	97627	97878	98113	98334	98541	98734	98913	99078	99229	14
47	97358	97623	97874	98110	98331	98538	98731	98910	99075	99226	13
48	97353	97619	97870	98106	98327	98535	98728	98907	99072	99224	12
49	97349	97615	97866	98102	98324	98531	98725	98904	99070	99221	11
50	4.97344	97610	97861	98098	98320	98528	98722	98901	99067	99219	10
51	97340	97606	97857	98094	98317	98525	98719	98898	99064	99217	9
52	97335	97602	97853	98090	98313	98521	98715	98896	99062	99214	8
53	97331	97597	97849	98087	98309	98518	98712	98893	99059	99212	7
54	97326	97593	97845	98083	98306	98515	98709	98890	99056	99209	6
55	4.97322	97589	97841	98079	98302	98511	98706	98887	99054	99207	5
56	97317	97584	97837	98075	98299	98508	98703	98884	99051	99204	4
57	97312	97580	97833	98071	98295	98505	98700	98881	99048	99202	3
58	97308	97576	97829	98067	98291	98501	98697	98878	99046	99200	2
59	97303	97571	97825	98063	98288	98498	98694	98875	99043	99197	1
60	97299	97567	97821	98060	98284	98494	98690	98872	99040	99195	0
	70°	71°	72°	73°	74°	75°	76°	77°	78°	79°	M.
	DIFFERENCE.								SINES.		

TABLE XII.

Logarithms of the Half Sum and Difference.

M.	COSINES. 9	8	7	6	5	HALF SUM. 4	3	2	1	0	
0	1.99462	99575	99675	99761	99834	99894	99940	99974	99993	00000	60
1	99460	99573	99674	99760	99833	99893	99940	99973	99993	00000	59
2	99458	99572	99672	99759	99832	99892	99939	99973	99993	00000	58
3	99456	99570	99670	99757	99831	99891	99938	99972	99993	00000	57
4	99454	99568	99669	99756	99830	99891	99938	99972	99992	00000	56
5	4.99452	99566	99667	99755	99829	99890	99937	99971	99992	00000	55
6	99450	99565	99666	99753	99828	99889	99936	99971	99992	00000	54
7	99448	99563	99664	99752	99827	99888	99936	99970	99992	00000	53
8	99446	99561	99663	99751	99825	99887	99935	99970	99992	00000	52
9	99444	99559	99661	99749	99824	99886	99934	99969	99991	00000	51
10	4.99442	99557	99659	99748	99823	99885	99934	99969	99991	00000	50
11	99440	99556	99658	99747	99822	99884	99933	99968	99991	00000	49
12	99438	99554	99656	99745	99821	99883	99932	99968	99990	00000	48
13	99436	99552	99655	99744	99820	99882	99932	99967	99990	00000	47
14	99434	99550	99653	99742	99819	99881	99931	99967	99990	00000	46
15	4.99432	99548	99651	99741	99817	99880	99930	99967	99990	00000	45
16	99429	99546	99650	99740	99816	99879	99929	99966	99989	00000	44
17	99427	99545	99648	99738	99815	99879	99929	99966	99989	99999	43
18	99425	99543	99647	99737	99814	99878	99928	99965	99989	99999	42
19	99423	99541	99645	99736	99813	99877	99927	99964	99989	99999	41
20	4.99421	99539	99643	99734	99812	99876	99926	99964	99988	99999	40
21	99419	99537	99642	99733	99810	99875	99926	99963	99988	99999	39
22	99417	99535	99640	99731	99809	99874	99925	99963	99988	99999	38
23	99415	99533	99638	99730	99808	99873	99924	99962	99987	99999	37
24	99413	99532	99637	99728	99807	99872	99923	99962	99987	99999	36
25	4.99411	99530	99635	99727	99806	99871	99923	99961	99987	99999	35
26	99409	99528	99633	99726	99804	99870	99922	99961	99986	99999	34
27	99407	99526	99632	99724	99803	99869	99921	99960	99986	99999	33
28	99404	99524	99630	99723	99802	99868	99920	99960	99986	99999	32
29	99402	99522	99629	99721	99801	99867	99920	99959	99985	99998	31
30	4.99400	99520	99627	99720	99800	99866	99919	99959	99985	99998	30
31	99398	99518	99625	99718	99798	99865	99918	99958	99985	99998	29
32	99396	99517	99624	99717	99797	99864	99917	99958	99984	99998	28
33	99394	99515	99622	99716	99796	99863	99917	99957	99984	99998	27
34	99392	99513	99620	99714	99795	99862	99916	99956	99984	99998	26
35	4.99390	99511	99618	99713	99793	99861	99915	99956	99983	99998	25
36	99388	99509	99617	99711	99792	99860	99914	99955	99983	99998	24
37	99385	99507	99615	99710	99791	99859	99913	99955	99983	99997	23
38	99383	99505	99613	99708	99790	99858	99913	99954	99982	99997	22
39	99381	99503	99612	99707	99788	99857	99912	99954	99982	99997	21
40	4.99379	99501	99610	99705	99787	99856	99911	99953	99982	99997	20
41	99377	99499	99608	99704	99786	99855	99910	99952	99981	99997	19
42	99375	99497	99607	99702	99785	99854	99909	99952	99981	99997	18
43	99372	99495	99605	99701	99783	99853	99909	99951	99981	99997	17
44	99370	99494	99603	99699	99782	99852	99908	99951	99980	99996	16
45	4.99368	99492	99601	99698	99781	99851	99907	99950	99980	99996	15
46	99366	99490	99600	99696	99780	99850	99906	99949	99979	99996	14
47	99364	99488	99598	99695	99778	99848	99905	99949	99979	99996	13
48	99362	99486	99596	99693	99777	99847	99904	99948	99979	99996	12
49	99359	99484	99595	99692	99776	99846	99904	99948	99978	99996	11
50	4.99357	99482	99593	99690	99775	99845	99903	99947	99978	99995	10
51	99355	99480	99591	99689	99773	99844	99902	99946	99977	99995	9
52	99353	99478	99589	99687	99772	99843	99901	99946	99977	99995	8
53	99351	99476	99588	99686	99771	99842	99900	99945	99977	99995	7
54	99348	99474	99586	99684	99769	99841	99899	99944	99976	99995	6
55	4.99346	99472	99584	99683	99768	99840	99898	99944	99976	99994	5
56	99344	99470	99582	99681	99767	99839	99898	99943	99975	99994	4
57	99342	99468	99581	99680	99765	99838	99897	99942	99975	99994	3
58	99340	99466	99579	99678	99764	99837	99896	99942	99974	99994	2
59	99337	99464	99577	99677	99763	99836	99895	99941	99974	99994	1
60	99335	99462	99575	99675	99761	99834	99894	99940	99974	99993	0
	80°	81°	82°	83°	84°	85°	86°	87°	88°	89°	M.
	DIFFERENCE.								SINES.		

TABLE XIII.

Logarithms of the Apparent Time, or Horary Angle.

M.	0 hours s. 0	s. 10	s. 20	s. 30	s. 40	s. 50	s. 60		Proportional parts for seconds. s. 1	s. 2	s. 3	s. 4	s. 5	s. 6	s. 7	s. 8	s. 9
0	¼.	12127	72333	07551	32539	51921	67757	59									
1	⅘.67757	81147	92745	02976	12127	20406	27963	58									
2	5.27963	34916	41352	47345	52951	58216	63181	57									
3	63181	67877	72332	76570	80611	84472	88168	56									
4	⅗.88168	91714	95121	98399	01557	04605	07550	55									
5	6.07550	10398	13155	15828	18421	20938	23385	54									
6	23385	25765	28081	30337	32536	34681	36774	53									
7	36774	38817	40814	42766	44675	46543	48372	52									
8	48372	50162	51916	53636	55323	56977	58600	51									
9	58600	60194	61759	63296	64806	66291	67751	50									
10	6.67751	69186	70598	71988	73355	74702	76028	49									
11	76028	77334	78620	79888	81137	82369	83584	48									
12	83584	84782	85963	87129	88279	89414	90535	47									
13	90535	91641	92733	93812	94877	95930	96970	46									
14	96970	97997	99013	00017	01009	01990	02960	45									
15	7.02960	03920	04869	05807	06736	07655	08564	44	93	187	280	373	467	560	653	746	840
16	08564	09464	10354	11236	12108	12972	13827	43	87	175	263	350	438	526	614	702	789
17	13827	14674	15513	16344	17167	17982	18790	42	82	165	248	331	413	496	579	662	744
18	18790	19590	20383	21168	21947	22719	23483	41	78	156	234	313	391	469	547	625	704
19	23483	24241	24993	25738	26477	27210	27936	40	74	148	222	296	370	444	518	592	666
20	7.27936	28656	29371	30079	30782	31479	32171	39	70	140	211	281	352	422	492	563	633
21	32171	32857	33538	34213	34884	35549	36209	38	67	134	201	268	335	403	470	537	604
22	36209	36864	37514	38159	38800	39435	40067	37	64	128	192	256	320	385	449	513	577
23	40067	40693	41315	41933	42546	43155	43760	36	61	123	184	245	306	368	430	491	552
24	43760	44361	44957	45549	46138	46722	47302	35	59	118	171	235	295	353	412	471	531
25	7.47302	47879	48452	49021	49586	50148	50706	34	56	113	169	226	282	339	396	452	509
26	50706	51260	51811	52358	52902	53443	53980	33	54	109	163	218	272	327	381	436	490
27	53980	54514	55045	55572	56096	56617	57135	32	52	105	157	209	262	314	367	420	472
28	57135	57650	58162	58670	59176	59679	60179	31	51	101	152	202	253	303	354	405	455
29	60179	60676	61170	61662	62151	62636	63120	30	49	98	147	195	244	293	342	392	441
30	7.63120	63600	64078	64553	65026	65496	65964	29	47	95	142	189	236	284	331	378	426
31	65964	66429	66891	67351	67809	68264	68717	28	46	92	137	183	229	275	321	366	412
32	68717	69167	69616	70061	70505	70946	71385	27	44	89	133	178	222	267	311	355	400
33	71385	71822	72257	72689	73119	73548	73974	26	43	86	129	172	215	258	301	344	388
34	73974	74398	74819	75239	75657	76073	76487	25	42	83	125	167	209	251	293	334	377
35	7.76487	76898	77308	77716	78122	78526	78929	24	41	81	122	162	203	243	284	325	366
36	78929	79329	79728	80124	80519	80912	81303	23	40	79	118	158	197	237	277	316	356
37	81303	81693	82081	82467	82851	83234	83615	22	39	77	115	154	192	231	270	308	347
38	83615	83994	84372	84747	85122	85494	85866	21	38	75	112	150	187	225	263	300	338
39	85866	86235	86603	86969	87334	87697	88059	20	37	73	109	146	182	219	256	292	329
40	7.88059	88419	88778	89135	89491	89846	90198	19	36	71	106	142	178	213	249	284	321
41	90198	90550	90900	91248	91596	91941	92286	18	35	70	104	139	174	208	243	278	313
42	92286	92629	92970	93311	93650	93987	94324	17	34	68	102	136	170	204	238	272	306
43	94324	94659	94992	95325	95656	95986	96315	16	33	66	100	133	166	199	232	265	299
44	96315	96642	96968	97293	97617	97939	98260	15	32	65	97	130	162	194	227	259	292
45	⅞.98260	98580	98899	99217	99534	99849	00163	14	32	63	95	127	158	190	222	253	286
46	8.00163	00476	00788	01099	01409	01717	02025	13	31	62	93	124	155	186	218	248	279
47	02025	02331	02636	02941	03244	03546	03847	12	30	61	91	121	152	182	212	243	273
48	03847	04147	04446	04744	05041	05336	05631	11	30	60	89	119	148	178	208	238	268
49	05631	05925	06218	06510	06800	07090	07379	10	29	58	87	116	145	175	204	233	262
50	8.07379	07667	07954	08240	08525	08809	09092	9	28	57	85	114	142	171	200	228	257
51	09092	09374	09656	09936	10216	10494	10772	8	28	56	84	112	140	168	196	224	252
52	10772	11048	11324	11599	11873	12147	12419	7	27	55	82	110	138	165	193	220	248
53	12419	12691	12961	13231	13500	13768	14035	6	27	54	81	108	135	162	189	216	243
54	14035	14302	14567	14832	15096	15359	15621	5	26	53	79	106	133	159	185	212	239
55	8.15621	15883	16144	16404	16663	16921	17179	4	26	52	78	104	130	156	182	208	234
56	17179	17436	17692	17947	18202	18455	18708	3	25	51	77	102	127	153	179	204	229
57	18708	18961	19212	19463	19713	19963	20211	2	25	50	75	100	125	150	175	200	224
58	20211	20459	20706	20953	21198	21444	21688	1	24	49	73	98	123	147	172	196	220
59	21688	21932	22175	22417	22658	22899	23140	0	24	48	72	96	120	145	169	193	217
	60s.	50s.	40s.	30s.	20s.	10s.	0s.	M.	1s.	2s.	3s.	4s.	5s.	6s.	7s.	8s.	9s.
	23 hours.								Proportional parts for seconds.								

TABLE XIII.

Logarithms of the Apparent Time, or Horary Angle.

M.	1 hour. s. 0	s. 10	s. 20	s. 30	s. 40	s. 50	s. 60		Proportional parts for seconds. s. 1	s. 2	s. 3	s. 4	s. 5	s. 6	s. 7	s. 8	s. 9
0	8.23140	23379	23618	23856	24094	24331	24567	59	24	47	71	95	118	142	166	190	213
1	24567	24802	25037	25272	25505	25738	25971	58	23	47	70	93	116	140	163	187	210
2	25971	26203	26434	26664	26894	27123	27352	57	23	46	69	92	115	138	161	184	207
3	27352	27580	27807	28034	28260	28486	28711	56	23	45	68	91	113	136	159	181	204
4	28711	28935	29159	29383	29605	29827	30049	55	22	44	67	89	111	133	156	178	201
5	8.30049	30270	30490	30710	30929	31148	31366	54	22	44	66	87	109	131	153	175	198
6	31366	31583	31800	32016	32233	32448	32663	53	22	43	65	86	108	130	151	173	195
7	32663	32877	33091	33304	33517	33729	33940	52	21	43	64	85	106	128	149	170	192
8	33940	34151	34362	34572	34782	34991	35199	51	21	42	63	84	105	126	147	168	189
9	35199	35407	35614	35821	36028	36234	36439	50	21	41	62	83	103	124	145	165	186
10	8.36439	36644	36849	37053	37256	37459	37662	49	20	41	61	82	102	122	143	163	184
11	37662	37864	38065	38266	38467	38667	38866	48	20	40	60	81	100	120	141	161	181
12	38866	39066	39264	39463	39660	39858	40055	47	20	40	60	80	99	119	139	159	179
13	40055	40251	40447	40642	40837	41032	41226	46	20	39	59	78	98	118	137	157	177
14	41226	41420	41613	41806	41998	42191	42382	45	19	39	58	77	96	116	135	154	174
15	8.42382	42573	42764	42954	43144	43333	43522	44	19	38	57	76	95	114	133	152	171
16	43522	43710	43898	44086	44273	44460	44647	43	19	37	56	75	93	112	131	150	169
17	44647	44833	45018	45204	45388	45573	45757	42	19	37	55	74	92	111	130	148	167
18	45757	45940	46124	46306	46489	46671	46852	41	18	37	55	73	91	110	128	146	165
19	46852	47034	47215	47395	47575	47755	47934	40	18	36	54	72	90	108	126	144	162
20	8.47934	48113	48292	48470	48647	48825	49002	39	18	35	53	71	89	107	125	142	160
21	49002	49179	49355	49531	49706	49882	50056	38	18	35	53	70	88	106	123	141	158
22	50056	50231	50405	50579	50752	50925	51098	37	17	35	52	70	87	104	122	139	157
23	51098	51270	51442	51614	51785	51956	52127	36	17	34	52	69	86	103	120	138	155
24	52127	52297	52467	52636	52805	52974	53143	35	17	34	51	68	85	102	119	136	153
25	8.53143	53311	53479	53646	53814	53980	54147	34	17	33	50	67	83	100	117	134	151
26	54147	54313	54479	54645	54810	54975	55139	33	17	33	50	66	82	99	116	132	149
27	55139	55303	55467	55631	55794	55957	56120	32	16	33	49	65	81	98	114	130	147
28	56120	56282	56444	56606	56767	56928	57089	31	16	32	48	64	80	97	113	129	145
29	57089	57249	57410	57569	57729	57888	58047	30	16	32	48	63	80	96	111	127	143
30	8.58047	58206	58364	58522	58680	58837	58994	29	16	32	47	63	79	95	110	126	142
31	58994	59151	59308	59464	59620	59776	59931	28	16	31	47	62	78	94	109	125	141
32	59931	60086	60241	60395	60550	60704	60857	27	15	31	46	62	77	93	108	123	139
33	60857	61011	61164	61317	61469	61621	61773	26	15	30	46	61	77	92	107	122	138
34	61773	61925	62076	62228	62379	62529	62679	25	15	30	45	60	76	91	106	121	136
35	8.62679	62830	62979	63129	63278	63427	63576	24	15	30	45	60	75	90	105	119	134
36	63576	63724	63872	64020	64168	64315	64463	23	15	30	45	59	74	89	104	118	133
37	64463	64609	64756	64902	65048	65194	65340	22	15	29	44	58	73	88	102	117	132
38	65340	65485	65630	65775	65920	66064	66208	21	15	29	43	58	72	87	101	116	130
39	66208	66352	66496	66639	66782	66926	67067	20	14	29	43	57	72	86	100	115	129
40	8.67067	67209	67352	67494	67635	67777	67918	19	14	28	43	57	71	85	99	113	128
41	67918	68059	68199	68340	68480	68620	68759	18	14	28	42	56	70	84	98	112	126
42	68759	68899	69038	69177	69316	69454	69593	17	14	28	42	55	69	83	97	111	125
43	69593	69731	69869	70006	70144	70281	70418	16	14	27	41	55	69	82	96	110	124
44	70418	70554	70691	70827	70963	71099	71234	15	14	27	41	54	68	82	95	109	123
45	8.71234	71370	71505	71640	71774	71909	72043	14	14	27	40	54	67	81	95	108	122
46	72043	72177	72311	72444	72578	72711	72844	13	13	27	40	53	67	80	94	107	121
47	72844	72977	73109	73241	73374	73505	73637	12	13	26	40	53	66	79	93	106	119
48	73637	73768	73900	74031	74162	74292	74423	11	13	26	39	52	65	78	92	105	118
49	74423	74553	74683	74813	74942	75072	75201	10	13	26	39	52	65	78	91	104	117
50	8.75201	75330	75458	75587	75715	75843	75971	9	13	26	38	51	64	77	90	103	116
51	75971	76099	76227	76354	76481	76608	76735	8	13	25	38	51	63	76	89	102	115
52	76735	76862	76988	77114	77240	77366	77492	7	13	25	38	50	63	76	88	101	114
53	77492	77617	77742	77867	77992	78117	78241	6	13	25	37	50	62	75	87	100	113
54	78241	78365	78489	78613	78737	78861	78984	5	12	25	37	50	62	75	87	99	112
55	8.78984	79107	79230	79353	79475	79598	79720	4	12	25	37	49	61	74	86	98	111
56	79720	79842	79964	80085	80207	80328	80449	3	12	25	37	49	61	73	85	98	110
57	80449	80570	80691	80812	80932	81052	81172	2	12	24	36	48	60	73	85	97	109
58	81172	81292	81412	81531	81651	81770	81889	1	12	24	36	48	60	72	84	96	108
59	81889	82008	82126	82245	82363	82481	82599	0	12	24	36	48	60	72	83	95	107
	60s.	50s.	40s.	30s.	20s	10s.	0s.	M.	1s.	2s.	3s.	4s.	5s.	6s.	7s.	8s.	9s.
	22 hours.								Proportional parts for seconds.								

TABLE XIII.

Logarithms of the Apparent Time, or Horary Angle.

M.	2 hours. s. 0	s. 10	s. 20	s. 30	s. 40	s. 50	s. 60		Proportional parts for seconds. s. 1	s. 2	s. 3	s. 4	s. 5	s. 6	s. 7	s. 8	s. 9
0	8.82599	82717	82835	82952	83069	83187	83303	59	12	23	35	47	59	70	82	93	105
1	83303	83420	83537	83653	83769	83885	84001	58	12	23	35	46	58	70	81	93	105
2	84001	84117	84233	84348	84464	84579	84694	57	11	23	35	46	57	69	80	92	104
3	84694	84808	84923	85037	85152	85266	85380	56	11	23	34	45	57	68	80	91	103
4	85380	85494	85607	85721	85834	85947	86060	55	11	23	34	45	57	68	79	90	102
5	8.86060	86173	86286	86398	86511	86623	86735	54	11	22	34	45	56	67	78	90	101
6	86735	86847	86959	87070	87182	87293	87404	53	11	22	33	45	56	67	78	89	100
7	87404	87515	87626	87736	87847	87957	88068	52	11	22	33	44	55	66	78	89	100
8	88068	88178	88288	88397	88507	88616	88726	51	11	22	33	44	55	66	77	88	99
9	88726	88835	88944	89053	89162	89270	89379	50	11	22	33	44	55	65	76	87	98
10	8.89379	89487	89595	89703	89811	89918	90026	49	11	22	32	43	54	65	76	86	97
11	90026	90133	90241	90348	90455	90562	90668	48	11	21	32	43	54	64	75	86	96
12	90668	90775	90881	90988	91094	91200	91306	47	11	21	32	42	53	64	74	85	95
13	91306	91411	91517	91622	91728	91833	91938	46	11	21	32	42	53	63	73	84	95
14	91938	92043	92147	92252	92356	92461	92565	45	10	21	32	42	53	63	73	84	94
15	8.92565	92669	92773	92877	92980	93084	93187	44	10	21	31	42	52	62	73	83	93
16	93187	93290	93393	93496	93599	93702	93804	43	10	20	31	41	52	62	72	82	93
17	93804	93907	94009	94111	94213	94315	94417	42	10	20	31	41	51	61	71	82	92
18	94417	94519	94620	94722	94823	94924	95025	41	10	20	30	40	51	61	71	81	91
19	95025	95126	95227	95327	95428	95528	95628	40	10	20	30	40	50	60	70	80	90
20	8.95628	95728	95828	95928	96028	96128	96227	39	10	20	30	40	50	60	70	80	90
21	96227	96326	96426	96525	96624	96723	96821	38	10	20	30	40	50	60	69	79	89
22	96821	96920	97018	97117	97215	97313	97411	37	10	20	30	39	49	59	69	79	88
23	97411	97509	97607	97704	97802	97899	97996	36	10	19	29	39	49	59	68	78	87
24	97996	98094	98191	98288	98384	98481	98578	35	10	19	29	39	49	58	68	77	87
25	8.98578	98674	98770	98866	98963	99058	99154	34	10	19	29	38	48	58	67	77	86
26	99154	99250	99346	99441	99536	99632	99727	33	10	19	29	38	48	57	67	76	86
27	9.99727	99822	99917	00012	00106	00201	00295	32	9	19	28	38	47	57	66	76	85
28	0.00295	00390	00484	00578	00672	00766	00860	31	9	19	28	38	47	56	66	75	85
29	00860	00953	01047	01140	01234	01327	01420	30	9	19	28	37	47	56	65	75	84
30	9.01420	01513	01606	01698	01791	01884	01976	29	9	18	28	37	46	55	65	74	83
31	01976	02068	02161	02253	02345	02437	02528	28	9	18	28	37	46	55	64	74	83
32	02528	02620	02712	02803	02894	02986	03077	27	9	18	27	37	46	55	64	73	82
33	03077	03168	03259	03350	03440	03531	03621	26	9	18	27	36	45	54	64	73	82
34	03621	03712	03802	03892	03982	04072	04162	25	9	18	27	36	45	54	63	72	81
35	9.04162	04252	04341	04431	04520	04610	04699	24	9	18	27	36	45	54	63	72	81
36	04699	04788	04877	04966	05055	05144	05232	23	9	18	27	36	45	53	62	71	80
37	05232	05321	05409	05498	05586	05674	05762	22	9	18	26	35	44	53	62	71	79
38	05762	05850	05938	06025	06113	06200	06288	21	9	17	26	35	44	53	61	70	79
39	06288	06375	06462	06550	06637	06724	06810	20	9	17	26	35	43	52	61	70	78
40	9.06810	06897	06984	07070	07157	07243	07329	19	9	17	26	35	43	52	61	69	78
41	07329	07415	07501	07587	07673	07759	07845	18	9	17	26	34	43	52	60	69	77
42	07845	07930	08016	08101	08186	08271	08357	17	9	17	26	34	43	51	60	68	77
43	08357	08442	08526	08611	08696	08781	08865	16	8	17	25	34	42	51	59	67	76
44	08865	08949	09034	09118	09202	09286	09370	15	8	17	25	34	42	51	59	67	76
45	9.09370	09454	09538	09622	09705	09789	09872	14	8	17	25	34	42	50	59	67	76
46	09872	09955	10039	10122	10205	10288	10371	13	8	17	25	33	42	50	58	66	75
47	10371	10453	10536	10619	10701	10784	10866	12	8	16	25	33	41	50	58	66	74
48	10866	10948	11030	11112	11194	11276	11358	11	8	16	25	33	41	49	57	66	74
49	11358	11440	11521	11603	11684	11765	11847	10	8	16	24	33	41	49	57	65	73
50	9.11847	11928	12009	12090	12171	12252	12332	9	8	16	24	32	40	49	57	65	73
51	12332	12413	12494	12574	12655	12735	12815	8	8	16	24	32	40	48	56	64	73
52	12815	12895	12975	13055	13135	13215	13295	7	8	16	24	32	40	48	56	64	72
53	13295	13374	13454	13533	13613	13692	13771	6	8	16	24	32	40	48	56	64	72
54	13771	13850	13929	14008	14087	14166	14245	5	8	16	24	32	40	47	55	63	71
55	9.14245	14325	14402	14480	14559	14637	14715	4	8	16	24	31	39	47	55	63	71
56	14715	14793	14871	14949	15027	15105	15183	3	8	16	23	31	39	47	55	62	70
57	15183	15260	15338	15415	15493	15570	15647	2	8	15	23	31	39	47	54	62	70
58	15647	15724	15802	15879	15955	16032	16109	1	8	15	23	31	38	46	54	62	69
59	16109	16186	16262	16339	16415	16492	16568	0	8	15	23	31	38	46	54	61	69
	60s.	50s.	40s.	30s.	20s.	10s.	0s.	M.	1s.	2s.	3s.	4s.	5s.	6s.	7s.	8s.	9s.
	21 hours.								Proportional parts for seconds.								

TABLE XIII.

Logarithms of the Apparent Time, or Horary Angle.

M.	3 HOURS. s. 0	s. 10	s. 20	s. 30	s. 40	s. 50	s. 60		PROPORTIONAL PARTS FOR SECONDS. s. 1	s. 2	s. 3	s. 4	s. 5	s. 6	s. 7	s. 8	s. 9
0	9.16568	16644	16720	16796	16872	16948	17024	59	8	15	23	30	38	46	53	61	68
1	17024	17100	17175	17251	17326	17402	17477	58	8	15	23	30	38	45	53	60	68
2	17477	17553	17628	17703	17778	17853	17928	57	7	15	22	30	37	45	52	60	67
3	17928	18003	18077	18152	18227	18301	18376	56	7	14	22	30	37	45	52	60	67
4	18376	18450	18524	18598	18673	18747	18821	55	7	14	22	30	37	44	52	59	67
5	9.18821	18895	18968	19042	19116	19190	19263	54	7	14	22	30	37	44	52	59	67
6	19263	19337	19410	19483	19557	19630	19703	53	7	14	22	29	37	44	51	59	66
7	19703	19776	19849	19922	19995	20067	20140	52	7	14	22	29	37	44	51	58	66
8	20140	20213	20285	20358	20430	20502	20574	51	7	14	22	29	36	44	51	58	65
9	20574	20647	20719	20791	20863	20935	21006	50	7	14	22	29	36	43	50	58	65
10	9.21006	21078	21150	21221	21293	21364	21436	49	7	14	21	29	36	43	50	57	64
11	21436	21507	21578	21650	21721	21792	21863	48	7	14	21	28	36	43	50	57	64
12	21863	21934	22004	22075	22146	22216	22287	47	7	14	21	28	35	42	49	56	63
13	22287	22358	22428	22498	22569	22639	22709	46	7	14	21	28	35	42	49	56	63
14	22709	22779	22849	22919	22989	23059	23128	45	7	14	21	28	35	42	49	56	63
15	9.23128	23198	23268	23337	23407	23476	23545	44	7	14	21	28	35	42	49	56	63
16	23545	23615	23684	23753	23822	23891	23960	43	7	14	21	28	35	41	48	55	62
17	23960	24029	24098	24166	24235	24304	24372	42	7	14	21	28	35	41	48	55	62
18	24372	24441	24509	24577	24646	24714	24782	41	7	14	21	27	34	41	48	55	62
19	24782	24850	24918	24986	25054	25122	25190	40	7	14	20	27	34	41	48	54	61
20	9.25190	25257	25325	25393	25460	25527	25595	39	7	14	20	27	34	41	47	54	61
21	25595	25662	25729	25796	25864	25931	25998	38	7	13	20	27	34	40	47	54	60
22	25998	26065	26132	26198	26265	26332	26398	37	7	13	20	27	34	40	47	54	60
23	26398	26465	26532	26598	26664	26731	26797	36	7	13	20	27	33	40	47	53	60
24	26797	26863	26929	26995	27061	27127	27193	35	7	13	20	26	33	40	46	53	59
25	9.27193	27259	27325	27390	27456	27521	27587	34	7	13	20	26	33	40	46	53	59
26	27587	27652	27718	27783	27848	27914	27979	33	7	13	20	26	33	39	46	52	59
27	27979	28044	28109	28174	28239	28304	28368	32	6	13	20	26	32	39	46	52	59
28	28368	28433	28498	28562	28627	28691	28756	31	6	13	20	26	32	39	46	52	59
29	28756	28820	28885	28949	29013	29077	29141	30	6	13	19	26	32	39	45	52	58
30	9.29141	29205	29269	29333	29397	29461	29524	29	6	13	19	26	32	38	45	51	58
31	29524	29588	29652	29715	29779	29842	29905	28	6	13	19	25	32	38	45	51	57
32	29905	29969	30032	30095	30158	30221	30285	27	6	13	19	25	32	38	44	51	57
33	30285	30347	30410	30473	30536	30599	30661	26	6	13	19	25	32	38	44	50	57
34	30661	30724	30787	30849	30912	30974	31036	25	6	12	19	25	31	38	44	50	56
35	9.31036	31099	31161	31223	31285	31347	31409	24	6	12	19	25	31	37	43	50	56
36	31409	31471	31533	31595	31657	31719	31780	23	6	12	19	25	31	37	43	50	56
37	31780	31842	31903	31965	32026	32088	32149	22	6	12	18	25	31	37	43	49	55
38	32149	32210	32272	32333	32394	32455	32516	21	6	12	18	24	31	37	43	49	55
39	32516	32577	32638	32699	32760	32820	32881	20	6	12	18	24	31	37	43	49	55
40	9.32881	32942	33002	33063	33123	33184	33244	19	6	12	18	24	30	36	42	48	55
41	33244	33304	33365	33425	33485	33545	33605	18	6	12	18	24	30	36	42	48	54
42	33605	33665	33725	33785	33845	33905	33965	17	6	12	18	24	30	36	42	48	54
43	33965	34024	34084	34143	34203	34262	34322	16	6	12	18	24	30	36	42	48	54
44	34322	34381	34441	34500	34559	34618	34677	15	6	12	18	24	30	36	41	47	53
45	9.34677	34736	34795	34854	34913	34972	35031	14	6	12	18	24	30	35	41	47	53
46	35031	35090	35148	35207	35266	35324	35383	13	6	12	18	24	30	35	41	47	53
47	35383	35441	35499	35558	35616	35674	35733	12	6	12	18	23	29	35	41	47	53
48	35733	35791	35849	35907	35965	36023	36081	11	6	12	17	23	29	35	41	46	52
49	36081	36139	36196	36254	36312	36369	36427	10	6	12	17	23	29	35	41	46	52
50	9.36427	36485	36542	36599	36657	36714	36771	9	6	11	17	23	29	35	40	46	52
51	36771	36829	36886	36943	37000	37057	37114	8	6	11	17	23	29	34	40	46	51
52	37114	37171	37228	37285	37342	37399	37455	7	6	11	17	23	29	34	40	46	51
53	37455	37512	37568	37625	37682	37738	37794	6	6	11	17	23	28	34	40	45	51
54	37794	37851	37907	37963	38020	38076	38132	5	6	11	17	22	28	34	39	45	51
55	9.38132	38188	38244	38300	38356	38412	38468	4	6	11	17	22	28	34	39	45	50
56	38468	38524	38579	38635	38691	38746	38802	3	6	11	17	22	28	33	39	44	50
57	38802	38857	38913	38968	39024	39079	39134	2	6	11	17	22	28	33	39	44	50
58	39134	39189	39245	39300	39355	39410	39465	1	6	11	16	22	28	33	39	44	50
59	39465	39520	39575	39630	39684	39739	39794	0	6	11	16	22	28	33	39	44	50
	60s.	50s.	40s.	30s.	20s.	10s.	0s.	M.	1s.	2s.	3s.	4s.	5s.	6s.	7s.	8s.	9s.
	20 HOURS.								PROPORTIONAL PARTS FOR SECONDS.								

TABLE XIII.

Logarithms of the Apparent Time, or Horary Angle.

M.	4 hours. s. 0	s. 10	s. 20	s. 30	s. 40	s. 50	s. 60		Proportional parts for seconds. s. 1	s. 2	s. 3	s. 4	s. 5	s. 6	s. 7	s. 8	s. 9
0	9.39794	39849	39903	39958	40012	40067	40121	59	5	11	16	22	28	33	39	44	50
1	40121	40176	40230	40284	40339	40393	40447	58	5	11	16	22	27	33	38	44	49
2	40447	40501	40555	40609	40663	40717	40771	57	5	11	16	22	27	32	38	43	49
3	40771	40825	40879	40933	40986	41040	41094	56	5	11	16	22	27	32	38	43	49
4	41094	41147	41201	41254	41308	41361	41415	55	5	11	16	21	27	32	37	43	48
5	9.41415	41468	41521	41575	41628	41681	41734	54	5	11	16	21	27	32	37	43	48
6	41734	41787	41840	41893	41946	41999	42052	53	5	11	16	21	27	32	37	43	48
7	42052	42105	42157	42210	42263	42315	42368	52	5	10	16	21	26	31	37	42	47
8	42368	42420	42473	42525	42578	42630	42682	51	5	10	16	21	26	31	37	42	47
9	42682	42735	42787	42839	42891	42943	42996	50	5	10	16	21	26	31	36	42	47
10	9.42996	43048	43100	43151	43203	43255	43307	49	5	10	16	21	26	31	36	42	47
11	43307	43359	43411	43462	43514	43565	43617	48	5	10	15	21	26	31	36	41	46
12	43617	43669	43720	43771	43823	43874	43925	47	5	10	15	20	25	31	36	41	46
13	43925	43977	44028	44079	44130	44181	44232	46	5	10	15	20	25	31	36	41	46
14	44232	44283	44334	44385	44436	44487	44538	45	5	10	15	20	25	31	36	41	46
15	9.44538	44589	44639	44690	44741	44791	44842	44	5	10	15	20	25	30	35	40	45
16	44842	44892	44943	44993	45044	45094	45144	43	5	10	15	20	25	30	35	40	45
17	45144	45195	45245	45295	45345	45395	45446	42	5	10	15	20	25	30	35	40	45
18	45446	45496	45546	45595	45645	45695	45745	41	5	10	15	20	25	30	35	40	45
19	45745	45795	45845	45894	45944	45994	46043	40	5	10	15	20	25	30	35	40	45
20	9.46043	46093	46142	46192	46241	46291	46340	39	5	10	15	20	25	30	35	40	45
21	46340	46389	46439	46488	46537	46586	46635	38	5	10	15	20	25	29	34	39	44
22	46635	46684	46733	46782	46831	46880	46929	37	5	10	15	20	24	29	34	39	44
23	46929	46978	47027	47076	47124	47173	47222	36	5	10	15	20	24	29	34	39	44
24	47222	47270	47319	47367	47416	47464	47513	35	5	10	15	19	24	29	34	39	44
25	9.47513	47561	47610	47658	47706	47754	47803	34	5	10	14	19	24	29	34	38	43
26	47803	47851	47899	47947	47995	48043	48091	33	5	10	14	19	24	29	34	38	43
27	48091	48139	48187	48235	48282	48330	48378	32	5	10	14	19	24	29	34	38	43
28	48378	48425	48473	48521	48568	48616	48664	31	5	9	14	19	24	29	33	38	43
29	48664	48711	48758	48806	48853	48900	48948	30	5	9	14	19	24	28	33	38	42
30	9.48948	48995	49042	49089	49137	49184	49231	29	5	9	14	19	23	28	33	38	42
31	49231	49278	49325	49372	49419	49465	49512	28	5	9	14	19	23	28	33	38	42
32	49512	49559	49606	49653	49699	49746	49793	27	5	9	14	19	23	28	33	37	42
33	49793	49839	49886	49932	49979	50025	50071	26	5	9	14	19	23	28	33	37	42
34	50071	50118	50164	50211	50257	50303	50349	25	5	9	14	19	23	28	33	37	42
35	9.50349	50395	50441	50488	50534	50580	50626	24	5	9	14	18	23	28	32	37	41
36	50626	50672	50717	50763	50809	50855	50901	23	5	9	14	18	23	28	32	37	41
37	50901	50946	50992	51038	51083	51129	51174	22	5	9	14	18	23	27	32	36	41
38	51174	51220	51265	51311	51356	51402	51447	21	5	9	14	18	23	27	32	36	41
39	51447	51492	51538	51583	51628	51673	51718	20	4	9	13	18	22	27	31	36	40
40	9.51718	51763	51808	51853	51898	51943	51988	19	4	9	13	18	22	27	31	36	40
41	51988	52033	52078	52123	52168	52212	52257	18	4	9	13	18	22	27	31	36	40
42	52257	52302	52346	52391	52435	52480	52525	17	4	9	13	18	22	27	31	36	40
43	52525	52569	52613	52658	52702	52747	52791	16	4	9	13	18	22	27	31	36	40
44	52791	52835	52879	52923	52968	53012	53056	15	4	9	13	18	22	27	31	35	40
45	9.53056	53100	53144	53188	53232	53276	53320	14	4	9	13	18	22	26	31	35	40
46	53320	53364	53407	53451	53495	53539	53582	13	4	9	13	18	22	26	31	35	40
47	53582	53626	53670	53713	53757	53800	53844	12	4	9	13	17	22	26	30	35	39
48	53844	53887	53931	53974	54017	54061	54104	11	4	9	13	17	22	26	30	35	39
49	54104	54147	54190	54234	54277	54320	54363	10	4	9	13	17	22	26	30	35	39
50	9.54363	54406	54449	54492	54535	54578	54621	9	4	9	13	17	22	26	30	34	39
51	54621	54664	54707	54749	54792	54835	54878	8	4	9	13	17	22	26	30	34	39
52	54878	54920	54963	55005	55048	55091	55133	7	4	8	13	17	21	26	30	34	38
53	55133	55175	55218	55260	55303	55345	55387	6	4	8	13	17	21	26	30	34	38
54	55387	55430	55472	55514	55556	55598	55641	5	4	8	13	17	21	25	29	34	38
55	9.55641	55683	55725	55767	55809	55851	55893	4	4	8	13	17	21	25	29	34	38
56	55893	55934	55976	56018	56060	56102	56144	3	4	8	13	17	21	25	29	34	38
57	56144	56185	56227	56269	56310	56352	56393	2	4	8	12	17	21	25	29	33	37
58	56393	56435	56476	56518	56559	56601	56642	1	4	8	12	17	21	25	29	33	37
59	56642	56683	56725	56766	56807	56848	56839	0	4	8	12	16	20	25	29	33	37
	60s.	50s.	40s.	30s.	20s.	10s.	0s.	M.	1s.	2s.	3s.	4s.	5s.	6s.	7s.	8s.	9s.
	10 hours.								Proportional parts for seconds								

Logarithms of the Apparent Time, or Horary Angle.

M.	5 hours. s. 0	s. 10	s. 20	s. 30	s. 40	s. 50	s. 60		Proportional parts for seconds. s. 1	s. 2	s. 3	s. 4	s. 5	s. 6	s. 7	s. 8	s. 9
0	9.56889	56931	56972	57013	57054	57095	57136	59	4	8	12	16	20	25	29	33	37
1	57136	57177	57218	57259	57299	57340	57381	58	4	8	12	16	20	25	29	33	37
2	57381	57422	57463	57503	57544	57585	57625	57	4	8	12	16	20	25	29	33	37
3	57625	57666	57706	57747	57787	57828	57868	56	4	8	12	16	20	24	28	32	36
4	57868	57909	57949	57990	58030	58070	58110	55	4	8	12	16	20	24	28	32	36
5	9.58110	58151	58191	58231	58271	58311	58351	54	4	8	12	16	20	24	28	32	36
6	58351	58391	58431	58471	58511	58551	58591	53	4	8	12	16	20	24	28	32	36
7	58591	58631	58671	58711	58750	58790	58830	52	4	8	12	16	20	24	28	32	36
8	58830	58870	58909	58949	58988	59028	59068	51	4	8	12	16	20	24	28	32	36
9	59068	59107	59147	59186	59225	59265	59304	50	4	8	12	16	20	24	28	32	36
10	9.59304	59344	59383	59422	59461	59501	59540	49	4	8	12	16	20	24	28	32	36
11	59540	59579	59618	59657	59696	59735	59774	48	4	8	12	16	20	23	27	31	35
12	59774	59813	59852	59891	59930	59969	60008	47	4	8	12	16	20	23	27	31	35
13	60008	60047	60085	60124	60163	60202	60240	46	4	8	12	16	20	23	27	31	35
14	60240	60279	60318	60356	60395	60433	60472	45	4	8	12	16	20	23	27	31	35
15	9.60472	60510	60549	60587	60625	60664	60702	44	4	8	12	15	19	23	27	31	35
16	60702	60740	60779	60817	60855	60893	60931	43	4	8	12	15	19	23	27	31	35
17	60931	60970	61008	61046	61084	61122	61160	42	4	8	11	15	19	23	27	30	34
18	61160	61198	61236	61274	61311	61349	61387	41	4	8	11	15	19	23	27	30	34
19	61387	61425	61463	61500	61538	61576	61613	40	4	8	11	15	19	23	27	30	34
20	9.61613	61651	61689	61726	61764	61801	61839	39	4	8	11	15	19	23	27	30	34
21	61839	61876	61914	61951	61988	62026	62063	38	4	7	11	15	19	22	26	30	34
22	62063	62100	62138	62175	62212	62249	62287	37	4	7	11	15	19	22	26	30	34
23	62287	62324	62361	62398	62435	62472	62509	36	4	7	11	15	18	22	26	30	33
24	62509	62546	62583	62620	62657	62693	62730	35	4	7	11	15	18	22	26	30	33
25	9.62730	62767	62804	62841	62877	62914	62951	34	4	7	11	15	18	22	26	30	33
26	62951	62987	63024	63061	63097	63134	63170	33	4	7	11	15	18	22	26	29	33
27	63170	63207	63243	63279	63316	63352	63389	32	4	7	11	15	18	22	26	29	33
28	63389	63425	63461	63497	63534	63570	63606	31	4	7	11	14	18	22	25	29	32
29	63606	63642	63678	63715	63751	63787	63823	30	4	7	11	14	18	22	25	29	32
30	9.63823	63859	63895	63931	63966	64002	64038	29	4	7	11	14	18	22	25	29	32
31	64038	64074	64110	64146	64181	64217	64253	28	4	7	11	14	18	22	25	29	32
32	64253	64289	64324	64360	64395	64431	64467	27	4	7	11	14	18	21	25	28	32
33	64467	64502	64538	64573	64609	64644	64679	26	4	7	11	14	18	21	25	28	32
34	64679	64715	64750	64785	64821	64856	64891	25	4	7	11	14	18	21	25	28	32
35	9.64891	64926	64962	64997	65032	65067	65102	24	4	7	10	14	18	21	25	28	31
36	65102	65137	65172	65207	65242	65277	65312	23	3	7	10	14	18	21	25	28	31
37	65312	65347	65382	65417	65452	65486	65521	22	3	7	10	14	18	21	25	28	31
38	65521	65556	65591	65625	65660	65695	65729	21	3	7	10	14	18	21	25	28	31
39	65729	65764	65799	65834	65868	65902	65937	20	3	7	10	14	17	21	24	28	31
40	9.65937	65971	66006	66040	66074	66109	66143	19	3	7	10	14	17	21	24	28	31
41	66143	66177	66212	66246	66280	66314	66348	18	3	7	10	14	17	21	24	28	31
42	66348	66383	66417	66451	66485	66519	66553	17	3	7	10	14	17	20	24	27	31
43	66553	66587	66621	66655	66689	66723	66757	16	3	7	10	14	17	20	24	27	30
44	66757	66791	66824	66858	66892	66926	66959	15	3	7	10	14	17	20	24	27	30
45	9.66959	66993	67027	67060	67094	67128	67161	14	3	7	10	14	17	20	24	27	30
46	67161	67195	67228	67262	67295	67329	67362	13	3	7	10	13	17	20	23	27	30
47	67362	67396	67429	67462	67496	67529	67562	12	3	7	10	13	17	20	23	27	30
48	67562	67596	67629	67662	67695	67729	67762	11	3	7	10	13	17	20	23	27	30
49	67762	67795	67828	67861	67894	67927	67960	10	3	7	10	13	16	20	23	26	30
50	9.67960	67993	68026	68059	68092	68125	68158	9	3	7	10	13	16	20	23	26	30
51	68158	68190	68223	68256	68289	68322	68354	8	3	7	10	13	16	20	23	26	30
52	68354	68387	68420	68452	68485	68517	68550	7	3	7	10	13	16	19	23	26	29
53	68550	68583	68615	68648	68680	68713	68745	6	3	7	10	13	16	19	23	26	29
54	68745	68777	68810	68842	68874	68907	68939	5	3	7	10	13	16	19	23	26	29
55	9.68939	68971	69004	69036	69068	69100	69132	4	3	6	10	13	16	19	22	26	29
56	69132	69164	69197	69229	69261	69293	69325	3	3	6	10	13	16	19	22	26	29
57	69325	69357	69389	69421	69453	69484	69516	2	3	6	10	13	16	19	22	26	29
58	69516	69548	69580	69612	69644	69675	69707	1	3	6	10	13	16	19	22	26	29
59	69707	69739	69770	69802	69834	69866	69897	0	3	6	10	13	16	19	22	26	29
	60s.	50s.	40s.	30s.	20s.	10s.	0s.	M.	1s.	2s.	3s.	4s.	5s.	6s.	7s.	8s.	9s.
	18 hours.								Proportional parts for seconds.								

TABLE XIII.

Logarithms of the Apparent Time, or Horary Angle.

M.	6 HOURS. s. 0	s. 10	s. 20	s. 30	s. 40	s. 50	s. 60		PROPORTIONAL PARTS FOR SECONDS. s. 1	s. 2	s. 3	s. 4	s. 5	s. 6	s. 7	s. 8	s. 9
0	9.69897	69929	69960	69992	70023	70055	70086	59	3	6	9	13	16	19	22	25	28
1	70086	70118	70149	70180	70211	70243	70274	58	3	6	9	13	16	19	22	25	28
2	70274	70306	70337	70368	70399	70431	70462	57	3	6	9	13	16	19	22	25	28
3	70462	70493	70524	70555	70586	70617	70648	56	3	6	9	12	15	19	22	25	28
4	70648	70680	70710	70741	70772	70803	70834	55	3	6	9	12	15	19	22	25	28
5	9.70834	70865	70896	70927	70958	70988	71019	54	3	6	9	12	15	19	22	25	28
6	71019	71050	71081	71111	71142	71173	71203	53	3	6	9	12	15	19	22	25	28
7	71203	71234	71265	71295	71326	71356	71387	52	3	6	9	12	15	18	21	24	27
8	71387	71417	71448	71478	71509	71539	71569	51	3	6	9	12	15	18	21	24	27
9	71569	71600	71630	71660	71691	71721	71751	50	3	6	9	12	15	18	21	24	27
10	9.71751	71781	71812	71842	71872	71902	71932	49	3	6	9	12	15	18	21	24	27
11	71932	71962	71992	72022	72052	72082	72112	48	3	6	9	12	15	18	21	24	27
12	72112	72142	72172	72202	72232	72262	72292	47	3	6	9	12	15	18	21	24	27
13	72292	72322	72352	72381	72411	72441	72471	46	3	6	9	12	15	18	21	24	27
14	72471	72500	72530	72560	72589	72619	72648	45	3	6	9	12	15	18	21	24	27
15	9.72648	72678	72708	72737	72767	72796	72825	44	3	6	9	12	15	18	21	24	27
16	72825	72855	72884	72914	72943	72972	73002	43	3	6	9	12	15	18	21	24	27
17	73002	73031	73060	73090	73119	73148	73177	42	3	6	9	12	14	17	20	23	26
18	73177	73207	73236	73265	73294	73323	73352	41	3	6	9	12	14	17	20	23	26
19	73352	73381	73410	73439	73468	73497	73526	40	3	6	9	12	14	17	20	23	26
20	9.73526	73555	73584	73613	73642	73671	73699	39	3	6	9	12	14	17	20	23	26
21	73699	73728	73757	73786	73815	73843	73872	38	3	6	9	11	14	17	20	23	26
22	73872	73901	73929	73958	73987	74015	74044	37	3	6	9	11	14	17	20	23	26
23	74044	74072	74101	74129	74158	74186	74215	36	3	6	9	11	14	17	20	23	26
24	74215	74243	74272	74300	74328	74357	74385	35	3	6	9	11	14	17	20	23	26
25	9.74385	74413	74442	74470	74498	74526	74554	34	3	6	8	11	14	17	20	22	25
26	74554	74583	74611	74639	74667	74695	74723	33	3	6	8	11	14	17	20	22	25
27	74723	74751	74779	74807	74835	74863	74891	32	3	6	8	11	14	17	20	22	25
28	74891	74919	74947	74975	75003	75031	75059	31	3	6	8	11	14	17	20	22	25
29	75059	75086	75114	75142	75170	75197	75225	30	3	6	8	11	14	17	20	22	25
30	9.75225	75253	75280	75308	75336	75363	75391	29	3	5	8	11	14	16	19	22	25
31	75391	75418	75446	75474	75501	75528	75556	28	3	5	8	11	14	16	19	22	25
32	75556	75583	75611	75638	75666	75693	75720	27	3	5	8	11	14	16	19	22	25
33	75720	75748	75775	75802	75830	75857	75884	26	3	5	8	11	14	16	19	22	25
34	75884	75911	75938	75966	75993	76020	76047	25	3	5	8	11	14	16	19	22	24
35	9.76047	76074	76101	76128	76155	76182	76209	24	3	5	8	11	14	16	19	22	24
36	76209	76236	76263	76290	76317	76344	76371	23	3	5	8	11	14	16	19	22	24
37	76371	76397	76424	76451	76478	76505	76531	22	3	5	8	11	14	16	19	21	24
38	76531	76558	76585	76611	76638	76665	76691	21	3	5	8	11	14	16	19	21	24
39	76691	76718	76745	76771	76798	76824	76851	20	3	5	8	11	13	16	19	21	24
40	9.76851	76877	76904	76930	76957	76983	77009	19	3	5	8	11	13	16	18	21	24
41	77009	77036	77062	77089	77115	77141	77167	18	3	5	8	11	13	16	18	21	24
42	77167	77194	77220	77246	77272	77298	77325	17	3	5	8	10	13	16	18	21	24
43	77325	77351	77377	77403	77429	77455	77481	16	3	5	8	10	13	16	18	21	24
44	77481	77507	77533	77559	77585	77611	77637	15	3	5	8	10	13	16	18	21	23
45	9.77637	77663	77689	77715	77741	77766	77792	14	3	5	8	10	13	15	18	21	23
46	77792	77818	77844	77870	77895	77921	77947	13	3	5	8	10	13	15	18	21	23
47	77947	77972	77998	78024	78049	78075	78101	12	3	5	8	10	13	15	18	21	23
48	78101	78126	78152	78177	78203	78228	78254	11	3	5	8	10	13	15	18	20	23
49	78254	78279	78305	78330	78355	78381	78406	10	3	5	8	10	13	15	18	20	23
50	9.78406	78431	78457	78482	78507	78533	78558	9	3	5	8	10	13	15	17	20	23
51	78558	78583	78608	78633	78659	78684	78709	8	3	5	7	10	13	15	17	20	23
52	78709	78734	78759	78784	78809	78834	78859	7	3	5	7	10	13	15	17	20	23
53	78859	78884	78909	78934	78959	78984	79009	6	3	5	7	10	13	15	17	20	23
54	79009	79034	79059	79084	79108	79133	79158	5	2	5	7	10	13	15	17	20	23
55	9.79158	79183	79208	79232	79257	79282	79306	4	2	5	7	10	13	15	17	20	23
56	79306	79331	79356	79380	79405	79430	79454	3	2	5	7	10	13	15	17	20	22
57	79454	79479	79503	79528	79552	79577	79601	2	2	5	7	10	12	15	17	20	22
58	79601	79626	79650	79674	79699	79723	79747	1	2	5	7	10	12	15	17	20	22
59	79747	79772	79796	79821	79845	79869	79893	0	2	5	7	10	12	15	17	20	22
	60s.	50s.	40s.	30s.	20s.	10s.	0s	M.	1s.	2s.	3s.	4s.	5s.	6s.	7s.	8s.	9s.

17 HOURS.

PROPORTIONAL PARTS FOR SECONDS.

TABLE XIII.

Logarithms of the Apparent Time, or Horary Angle.

M.	7 hours. s. 0	s. 10	s. 20	s. 30	s. 40	s. 50	s. 60		Proportional parts for seconds. s. 1	s. 2	s. 3	s. 4	s. 5	s. 6	s. 7	s. 8	s. 9
0	9.79893	79918	79942	79966	79990	80014	80038	59	2	5	7	10	12	14	17	19	22
1	80038	80063	80087	80111	80135	80159	80183	58	2	5	7	10	12	14	17	19	22
2	80183	80207	80231	80255	80279	80303	80327	57	2	5	7	10	12	14	17	19	22
3	80327	80350	80374	80398	80422	80446	80470	56	2	5	7	10	12	14	17	19	22
4	80470	80494	80517	80541	80565	80588	80612	55	2	5	7	9	12	14	16	19	21
5	9.80612	80636	80660	80683	80707	80730	80754	54	2	5	7	9	12	14	16	19	21
6	80754	80778	80801	80825	80848	80872	80895	53	2	5	7	9	12	14	16	19	21
7	80895	80919	80942	80966	80989	81012	81036	52	2	5	7	9	12	14	16	19	21
8	81036	81059	81082	81106	81129	81152	81176	51	2	5	7	9	11	14	16	18	21
9	81176	81199	81222	81245	81269	81292	81315	50	2	5	7	9	11	14	16	18	21
10	9.81315	81338	81361	81384	81407	81430	81454	49	2	5	7	9	11	14	16	18	21
11	81454	81477	81500	81523	81546	81569	81592	48	2	5	7	9	11	14	16	18	21
12	81592	81614	81637	81660	81683	81706	81729	47	2	5	7	9	11	14	16	18	21
13	81729	81752	81775	81797	81820	81843	81866	46	2	5	7	9	11	14	16	18	21
14	81866	81888	81911	81934	81956	81979	82002	45	2	5	7	9	11	14	16	18	20
15	9.82002	82024	82047	82070	82092	82115	82137	44	2	5	7	9	11	14	16	18	20
16	82137	82160	82182	82205	82227	82250	82272	43	2	5	7	9	11	14	16	18	20
17	82272	82294	82317	82339	82362	82384	82406	42	2	5	7	9	11	14	16	18	20
18	82406	82429	82451	82473	82495	82518	82540	41	2	5	7	9	11	14	16	18	20
19	82540	82562	82584	82606	82629	82651	82673	40	2	4	7	9	11	13	15	18	20
20	9.82673	82695	82717	82739	82761	82783	82805	39	2	4	7	9	11	13	15	18	20
21	82805	82827	82849	82871	82893	82915	82937	38	2	4	7	9	11	13	15	18	20
22	82937	82959	82981	83003	83025	83046	83068	37	2	4	7	9	11	13	15	18	20
23	83068	83090	83112	83134	83155	83177	83199	36	2	4	7	9	11	13	15	18	20
24	83199	83220	83242	83264	83285	83307	83329	35	2	4	6	9	11	13	15	17	19
25	9.83329	83350	83372	83393	83415	83436	83458	34	2	4	6	9	11	13	15	17	19
26	83458	83479	83501	83522	83544	83565	83587	33	2	4	6	9	11	13	15	17	19
27	83587	83608	83629	83651	83672	83694	83715	32	2	4	6	9	11	13	15	17	19
28	83715	83736	83757	83779	83800	83821	83842	31	2	4	6	9	11	13	15	17	19
29	83842	83864	83885	83906	83927	83948	83969	30	2	4	6	8	11	13	15	17	19
30	9.83969	83990	84011	84033	84054	84075	84096	29	2	4	6	8	11	13	15	17	19
31	84096	84117	84138	84159	84179	84200	84221	28	2	4	6	8	11	13	15	17	19
32	84221	84242	84263	84284	84305	84326	84346	27	2	4	6	8	11	13	15	17	19
33	84346	84367	84388	84409	84430	84450	84471	26	2	4	6	8	11	13	15	17	19
34	84471	84492	84512	84533	84554	84574	84595	25	2	4	6	8	10	12	14	16	18
35	9.84595	84616	84636	84657	84677	84698	84718	24	2	4	6	8	10	12	14	16	18
36	84718	84739	84759	84780	84800	84821	84841	23	2	4	6	8	10	12	14	16	18
37	84841	84861	84882	84902	84923	84943	84963	22	2	4	6	8	10	12	14	16	18
38	84963	84984	85004	85024	85044	85065	85085	21	2	4	6	8	10	12	14	16	18
39	85085	85105	85125	85145	85166	85186	85206	20	2	4	6	8	10	12	14	16	18
40	9.85206	85226	85246	85266	85286	85306	85326	19	2	4	6	8	10	12	14	16	18
41	85326	85346	85366	85386	85406	85426	85446	18	2	4	6	8	10	12	14	16	18
42	85446	85466	85486	85506	85526	85546	85565	17	2	4	6	8	10	12	14	16	18
43	85565	85585	85605	85625	85645	85664	85684	16	2	4	6	8	10	12	14	16	18
44	85684	85704	85724	85743	85763	85783	85802	15	2	4	6	8	10	12	14	16	18
45	9.85802	85822	85841	85861	85881	85900	85920	14	2	4	6	8	10	12	14	16	18
46	85920	85939	85959	85978	85998	86017	86037	13	2	4	6	8	10	12	14	16	18
47	86037	86056	86076	86095	86114	86134	86153	12	2	4	6	8	10	12	14	16	18
48	86153	86172	86192	86211	86230	86250	86269	11	2	4	6	8	10	12	14	16	18
49	86269	86288	86307	86327	86346	86365	86384	10	2	4	6	8	10	12	14	16	18
50	9.86384	86403	86423	86442	86461	86480	86499	9	2	4	6	8	9	11	13	15	17
51	86499	86518	86537	86556	86575	86594	86613	8	2	4	6	8	9	11	13	15	17
52	86613	86632	86651	86670	86689	86708	86727	7	2	4	6	8	9	11	13	15	17
53	86727	86746	86764	86783	86802	86821	86840	6	2	4	6	8	9	11	13	15	17
54	86840	86858	86877	86896	86915	86933	86952	5	2	4	6	8	9	11	13	15	17
55	9.86952	86971	86990	87008	87027	87045	87064	4	2	4	6	8	9	11	13	15	17
56	87064	87083	87101	87120	87138	87157	87175	3	2	4	6	7	9	11	13	15	17
57	87175	87194	87212	87231	87249	87268	87286	2	2	4	6	7	9	11	13	15	17
58	87286	87305	87323	87341	87360	87378	87396	1	2	4	6	7	9	11	13	15	17
59	87396	87415	87433	87451	87470	87488	87506	0	2	4	6	7	9	11	13	15	17
	60s.	50s.	40s.	30s.	20s.	10s.	0s.	M.	1s.	2s.	3s.	4s.	5s.	6s.	7s.	8s.	9s.
	16 hours.								Proportional parts for seconds.								

TABLE XIII.

Logarithms of the Apparent Time, or Horary Angle.

M.	8 Hours. s. 0	s. 10	s. 20	s. 30	s. 40	s. 50	s. 60		Proportional parts for seconds. s. 1	s. 2	s. 3	s. 4	s. 5	s. 6	s. 7	s. 8	s. 9
0	9.87500	87524	87543	87561	87579	87597	87615	59	2	4	5	7	9	11	13	14	16
1	87615	87633	87652	87670	87688	87706	87724	58	2	4	5	7	9	11	13	14	16
2	87724	87742	87760	87778	87796	87814	87832	57	2	4	5	7	9	11	13	14	16
3	87832	87850	87868	87886	87904	87921	87939	56	2	4	5	7	9	11	13	14	16
4	8793	87957	87975	87993	88011	88028	88046	55	2	4	5	7	9	11	13	14	16
5	9.88046	88064	88082	88100	88117	88135	88153	54	2	4	5	7	9	11	13	14	16
6	88153	88170	88188	88206	88223	88241	88259	53	2	3	5	7	9	11	12	14	16
7	88259	88276	88294	88311	88329	88346	88364	52	2	3	5	7	9	11	12	14	16
8	88364	88381	88399	88416	88434	88451	88469	51	2	3	5	7	9	11	12	14	16
9	88469	88486	88503	88521	88538	88556	88573	50	2	3	5	7	9	11	12	14	16
10	9.88573	88590	88607	88625	88642	88659	88677	49	2	3	5	7	8	10	12	14	15
11	88677	88694	88711	88728	88745	88763	88780	48	2	3	5	7	8	10	12	14	15
12	88780	88797	88814	88831	88848	88865	88882	47	2	3	5	7	8	10	12	14	15
13	88882	88899	88916	88933	88950	88967	88984	46	2	3	5	7	8	10	12	14	15
14	88984	89001	89018	89035	89052	89069	89086	45	2	3	5	7	8	10	12	14	15
15	9.89086	89103	89120	89137	89153	89170	89187	44	2	3	5	7	8	10	12	14	15
16	89187	89204	89221	89237	89254	89271	89287	43	2	3	5	7	8	10	12	14	15
17	89287	89304	89321	89338	89354	89371	89387	42	2	3	5	7	8	10	12	14	15
18	89387	89404	89421	89438	89454	89470	89487	41	2	3	5	7	8	10	12	13	15
19	89487	89503	89520	89536	89553	89569	89586	40	2	3	5	7	8	10	12	13	15
20	9.89586	89602	89619	89635	89651	89668	89684	39	2	3	5	7	8	10	12	13	15
21	89684	89701	89717	89733	89749	89766	89782	38	2	3	5	7	8	10	12	13	15
22	89782	89798	89815	89831	89847	89863	89879	37	2	3	5	7	8	10	12	13	15
23	89879	89896	89912	89928	89944	89960	89976	36	2	3	5	6	8	10	11	13	14
24	89976	89992	90008	90024	90040	90056	90072	35	2	3	5	6	8	10	11	13	14
25	9.90072	90088	90104	90120	90136	90152	90168	34	2	3	5	6	8	10	11	13	14
26	90168	90184	90200	90216	90232	90248	90263	33	2	3	5	6	8	10	11	13	14
27	90263	90279	90295	90311	90327	90342	90358	32	2	3	5	6	8	10	11	13	14
28	90358	90374	90390	90405	90421	90437	90452	31	2	3	5	6	8	10	11	13	14
29	90452	90468	90484	90499	90515	90531	90546	30	2	3	5	6	8	10	11	13	14
30	9.90546	90562	90577	90593	90608	90624	90639	29	2	3	5	6	8	9	11	12	14
31	90639	90655	90670	90686	90701	90717	90732	28	2	3	5	6	8	9	11	12	14
32	90732	90747	90763	90778	90794	90809	90824	27	2	3	5	6	8	9	11	12	14
33	90824	90840	90855	90870	90885	90901	90916	26	2	3	5	6	8	9	11	12	14
34	90916	90931	90946	90961	90977	90992	91007	25	2	3	5	6	8	9	11	12	14
35	9.91007	91022	91037	91052	91067	91083	91098	24	2	3	4	6	7	9	10	12	14
36	91098	91113	91128	91143	91158	91173	91188	23	2	3	4	6	7	9	10	12	14
37	91188	91203	91218	91233	91248	91262	91277	22	2	3	4	6	7	9	10	12	14
38	91277	91292	91307	91322	91337	91352	91367	21	2	3	4	6	7	9	10	12	14
39	91367	91381	91396	91411	91426	91440	91455	20	2	3	4	6	7	9	10	12	14
40	9.91455	91470	91485	91499	91514	91529	91543	19	1	3	4	6	7	9	10	12	13
41	91543	91558	91573	91587	91602	91616	91631	18	1	3	4	6	7	9	10	12	13
42	91631	91645	91660	91674	91689	91703	91718	17	1	3	4	6	7	9	10	12	13
43	91718	91732	91747	91761	91776	91790	91805	16	1	3	4	6	7	9	10	12	13
44	91805	91819	91833	91848	91862	91876	91891	15	1	3	4	6	7	9	10	12	13
45	9.91891	91905	91919	91934	91948	91962	91976	14	1	3	4	6	7	8	10	11	13
46	91976	91991	92005	92019	92033	92047	92061	13	1	3	4	6	7	8	10	11	13
47	92061	92076	92090	92104	92118	92132	92146	12	1	3	4	6	7	8	10	11	13
48	92146	92160	92174	92188	92202	92216	92230	11	1	3	4	6	7	8	10	11	13
49	92230	92244	92258	92272	92286	92300	92314	10	1	3	4	6	7	8	10	11	13
50	9.92314	92328	92342	92355	92369	92383	92397	9	1	3	4	6	7	8	10	11	13
51	92397	92411	92425	92438	92452	92466	92480	8	1	3	4	6	7	8	10	11	13
52	92480	92493	92507	92521	92534	92548	92562	7	1	3	4	5	7	8	9	11	12
53	92562	92575	92589	92603	92616	92630	92643	6	1	3	4	5	7	8	9	11	12
54	92643	92657	92670	92684	92698	92711	92725	5	1	3	4	5	7	8	9	11	12
55	9.92725	92738	92751	92765	92778	92792	92805	4	1	3	4	5	7	8	9	11	12
56	92805	92819	92832	92845	92859	92872	92885	3	1	3	4	5	7	8	9	11	12
57	92885	92899	92912	92925	92939	92952	92965	2	1	3	4	5	7	8	9	11	12
58	92965	92978	92992	93005	93018	93031	93044	1	1	3	4	5	7	8	9	10	12
59	93044	93057	93071	93084	93097	93110	93123	0	1	3	4	5	7	8	9	10	12
	60s.	50s.	40s.	30s.	20s.	10s.	0s.	M.	1s.	2s.	3s.	4s.	5s.	6s.	7s.	8s.	9s.
	15 Hours.								Proportional parts for seconds								

TABLE XIV.

Logarithms of the Moon's Horizontal Parallax.

S.	MOON'S HORIZONTAL PARALLAX. 53′	54′	55′	56′	57′	58′	59′	60′	61′	S.
0	0.0710	0.0629	0.0549	0.0471	0.0394	0.0318	0.0244	0.0171	0.0099	0
1	0709	0627	0548	0470	0393	0317	0243	0170	0098	1
2	0707	0626	0546	0468	0391	0316	0242	0169	0097	2
3	0706	0625	0545	0467	0390	0315	0241	0168	0096	3
4	0704	0623	0544	0466	0389	0313	0239	0166	0095	4
5	0.0703	0.0622	0.0542	0.0464	0.0388	0.0312	0.0238	0.0165	0.0093	5
6	0702	0621	0541	0463	0386	0311	0237	0164	0092	6
7	0700	0619	0540	0462	0385	0310	0236	0163	0091	7
8	0699	0618	0539	0460	0384	0308	0234	0162	0090	8
9	0698	0617	0537	0459	0383	0307	0233	0160	0089	9
10	0.0696	0.0615	0.0536	0.0458	0.0381	0.0306	0.0232	0.0159	0.0088	10
11	0695	0614	0535	0457	0380	0305	0231	0158	0086	11
12	0694	0613	0533	0455	0379	0303	0230	0157	0085	12
13	0692	0611	0532	0454	0377	0302	0228	0156	0084	13
14	0691	0610	0531	0453	0376	0301	0227	0154	0083	14
15	0.0690	0.0609	0.0529	0.0451	0.0375	0.0300	0.0226	0.0153	0.0082	15
16	0688	0607	0528	0450	0374	0299	0225	0152	0080	16
17	0687	0606	0527	0449	0372	0297	0223	0151	0079	17
18	0685	0605	0525	0448	0371	0296	0222	0150	0078	18
19	0684	0603	0524	0446	0370	0295	0221	0148	0077	19
20	0.0683	0.0602	0.0523	0.0445	0.0369	0.0294	0.0220	0.0147	0.0076	20
21	0681	0601	0522	0444	0367	0292	0219	0146	0075	21
22	0680	0599	0520	0442	0366	0291	0217	0145	0073	22
23	0678	0598	0519	0441	0365	0290	0216	0144	0072	23
24	0677	0597	0518	0440	0364	0289	0215	0142	0071	24
25	0.0676	0.0595	0.0516	0.0439	0.0362	0.0287	0.0214	0.0141	0.0070	25
26	0674	0594	0515	0437	0361	0286	0212	0140	0069	26
27	0673	0593	0514	0436	0360	0285	0211	0139	0068	27
28	0672	0591	0512	0435	0359	0284	0210	0138	0066	28
29	0670	0590	0511	0433	0357	0282	0209	0136	0065	29
30	0.0669	0.0589	0.0510	0.0432	0.0356	0.0281	0.0208	0.0135	0.0064	30
31	0668	0587	0508	0431	0355	0280	0206	0134	0063	31
32	0666	0586	0507	0430	0353	0279	0205	0133	0062	32
33	0665	0585	0506	0428	0352	0277	0204	0132	0060	33
34	0664	0583	0505	0427	0351	0276	0203	0130	0059	34
35	0.0662	0.0582	0.0503	0.0426	0.0350	0.0275	0.0201	0.0129	0.0058	35
36	0661	0581	0502	0425	0349	0274	0200	0128	0057	36
37	0660	0579	0501	0423	0347	0273	0199	0127	0056	37
38	0658	0578	0499	0422	0346	0271	0198	0126	0055	38
39	0657	0577	0498	0421	0345	0270	0197	0124	0053	39
40	0.0655	0.0575	0.0497	0.0419	0.0343	0.0269	0.0195	0.0123	0.0052	40
41	0654	0574	0495	0418	0342	0268	0194	0122	0051	41
42	0653	0573	0494	0417	0341	0266	0193	0121	0050	42
43	0651	0571	0493	0416	0340	0265	0192	0120	0049	43
44	0650	0570	0492	0414	0338	0264	0191	0118	0048	44
45	0.0649	0.0569	0.0490	0.0413	0.0337	0.0263	0.0189	0.0117	0.0046	45
46	0648	0568	0489	0412	0336	0261	0188	0116	0045	46
47	0646	0566	0488	0411	0335	0260	0187	0115	0044	47
48	0645	0565	0486	0409	0333	0259	0186	0114	0043	48
49	0644	0564	0485	0408	0332	0258	0185	0112	0042	49
50	0.0642	0.0562	0.0484	0.0407	0.0331	0.0256	0.0183	0.0111	0.0040	50
51	0641	0561	0482	0405	0330	0255	0182	0110	0039	51
52	0639	0560	0481	0404	0328	0254	0181	0109	0038	52
53	0638	0558	0480	0403	0327	0253	0179	0108	0037	53
54	0637	0557	0479	0402	0326	0252	0178	0107	0036	54
55	0.0635	0.0556	0.0477	0.0400	0.0325	0.0250	0.0177	0.0105	0.0035	55
56	0634	0554	0476	0399	0323	0249	0176	0104	0033	56
57	0633	0553	0475	0398	0322	0248	0175	0103	0032	57
58	0631	0552	0473	0396	0321	0247	0174	0102	0031	58
59	0630	0550	0472	0395	0320	0245	0172	0101	0030	59
S.	53′	54′	55′	56′	57′	58′	59′	60′	61′	S.

TABLE XV

Logarithms of the Apparent Altitudes.

M.	APPARENT ALTITUDES. 5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	M.
0	1.5197	4408	3741	3164	2657	2203	1794	1421	1079	0763	0470	1.0197	0
1	5183	4396	3731	3155	2649	2196	1788	1415	1074	0758	0465	0192	1
2	5168	4384	3721	3147	2641	2189	1781	1409	1068	0753	0461	0188	2
3	5154	4372	3710	3138	2633	2182	1775	1403	1063	0748	0456	0183	3
4	5140	4360	3700	3129	2625	2175	1768	1398	1057	0743	0451	0179	4
5	1.5125	4348	3690	3120	2617	2168	1762	1392	1052	0738	0447	1.0175	5
6	5111	4336	3680	3111	2609	2161	1755	1386	1046	0733	0442	0170	6
7	5097	4324	3670	3102	2601	2153	1749	1380	1041	0728	0437	0166	7
8	5083	4313	3660	3093	2593	2146	1742	1374	1036	0723	0433	0162	8
9	5069	4301	3649	3084	2585	2139	1736	1368	1030	0718	0428	0157	9
10	1.5055	4289	3639	3075	2578	2132	1730	1362	1025	0713	0423	1.0153	10
11	5041	4277	3629	3067	2570	2125	1723	1356	1019	0708	0418	0148	11
12	5027	4265	3619	3058	2562	2118	1717	1350	1014	0703	0414	0144	12
13	5013	4254	3609	3049	2554	2111	1710	1345	1009	0698	0409	0140	13
14	4999	4243	3599	3040	2546	2104	1704	1339	1003	0693	0405	0135	14
15	1.4986	4231	3589	3032	2539	2097	1698	1333	0998	0688	0400	1.0131	15
16	4972	4220	3580	3023	2531	2090	1691	1327	0992	0683	0395	0127	16
17	4958	4208	3570	3014	2523	2083	1685	1321	0987	0678	0391	0122	17
18	4945	4197	3560	3006	2515	2076	1679	1316	0982	0673	0386	0118	18
19	4931	4185	3550	2997	2508	2069	1672	1310	0976	0668	0381	0114	19
20	1.4918	4174	3540	2988	2500	2062	1666	1304	0971	0663	0377	1.0109	20
21	4904	4162	3530	2980	2492	2055	1660	1298	0966	0658	0372	0105	21
22	4891	4151	3520	2971	2485	2049	1653	1292	0960	0653	0368	0101	22
23	4877	4140	3511	2963	2477	2042	1647	1287	0955	0648	0363	0097	23
24	4864	4128	3501	2954	2469	2035	1641	1281	0950	0643	0358	0092	24
25	1.4850	4117	3491	2945	2462	2028	1635	1275	0945	0638	0354	1.0088	25
26	4837	4106	3482	2937	2454	2021	1628	1269	0939	0634	0349	0084	26
27	4824	4095	3472	2928	2447	2014	1622	1264	0934	0629	0345	0079	27
28	4811	4084	3462	2920	2439	2007	1616	1258	0929	0624	0340	0075	28
29	4797	4073	3453	2911	2431	2000	1610	1252	0923	0619	0336	0071	29
30	1.4784	4061	3443	2903	2424	1994	1604	1247	0918	0614	0331	1.0067	30
31	4771	4050	3433	2894	2416	1987	1597	1241	0913	0609	0326	0062	31
32	4758	4039	3424	2886	2409	1980	1591	1235	0908	0604	0322	0058	32
33	4745	4028	3414	2878	2401	1973	1585	1230	0902	0599	0317	0054	33
34	4732	4017	3405	2869	2394	1966	1579	1224	0897	0595	0313	0050	34
35	1.4719	4006	3395	2861	2386	1960	1573	1218	0892	0590	0308	1.0045	35
36	4706	3995	3386	2853	2379	1953	1566	1213	0887	0585	0304	0041	36
37	4693	3984	3376	2844	2371	1946	1560	1207	0881	0580	0299	0037	37
38	4681	3974	3367	2836	2364	1939	1554	1201	0876	0575	0295	0033	38
39	4668	3963	3358	2828	2357	1933	1548	1196	0871	0570	0290	0028	39
40	1.4655	3952	3348	2819	2349	1926	1542	1190	0866	0565	0286	1.0024	40
41	4642	3941	3339	2811	2342	1919	1536	1184	0861	0561	0281	0020	41
42	4630	3930	3329	2803	2334	1913	1530	1179	0855	0556	0277	0016	42
43	4617	3920	3320	2794	2327	1906	1523	1173	0850	0551	0272	0012	43
44	4604	3909	3311	2786	2320	1899	1517	1168	0845	0546	0268	0007	44
45	1.4592	3898	3301	2778	2312	1893	1511	1162	0840	0541	0263	1.0003	45
46	4579	3888	3292	2770	2305	1886	1505	1156	0835	0537	0259	0.9999	46
47	4567	3877	3283	2762	2297	1879	1499	1151	0830	0532	0254	9995	47
48	4554	3866	3274	2753	2290	1873	1493	1145	0825	0527	0250	9991	48
49	4542	3856	3264	2745	2283	1866	1487	1140	0819	0522	0245	9986	49
50	1.4530	3845	3255	2737	2276	1860	1481	1134	0814	0517	0241	0.9982	50
51	4517	3835	3246	2729	2268	1853	1475	1129	0809	0513	0236	9978	51
52	4505	3824	3237	2721	2261	1846	1469	1123	0804	0508	0232	9974	52
53	4493	3814	3228	2713	2254	1840	1463	1118	0799	0503	0228	9970	53
54	4480	3803	3219	2705	2247	1833	1457	1112	0794	0498	0223	9966	54
55	1.4468	3793	3210	2697	2239	1827	1451	1107	0789	0494	0219	0.9961	55
56	4456	3782	3201	2689	2232	1820	1445	1101	0784	0489	0214	9957	56
57	4444	3772	3191	2681	2225	1814	1439	1096	0778	0484	0210	9953	57
58	4432	3762	3182	2673	2218	1807	1433	1090	0773	0479	0205	9949	58
59	4420	3751	3173	2665	2210	1801	1427	1085	0768	0475	0201	9945	59
M.	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	M.

APPARENT ALTITUDES.

TABLE XV.

Logarithms of the Apparent Altitudes.

M.	APPARENT ALTITUDES. 0 17	0 18	0 19	0 20	0 21	0 22	0 23	0 24	0 25	0 26	0 27	0 28	M.
0	0.9941	9700	9474	9259	9057	8864	8681	8507	8341	8182	8030	7884	0
1	9937	9696	9470	9256	9053	8861	8678	8504	8338	8179	8027	7882	1
2	9932	9692	9466	9253	9050	8858	8675	8501	8335	8176	8025	7879	2
3	9928	9689	9463	9249	9047	8855	8672	8498	8332	8174	8022	7877	3
4	9924	9685	9459	9246	9044	8852	8669	8496	8330	8171	8020	7874	4
5	0.9920	9681	9455	9242	9040	8849	8666	8493	8327	8169	8017	7872	5
6	9916	9677	9452	9239	9037	8846	8663	8490	8324	8166	8015	7870	6
7	9912	9673	9448	9235	9034	8842	8660	8487	8322	8163	8012	7867	7
8	9908	9669	9444	9232	9030	8839	8657	8484	8319	8161	8010	7865	8
9	9904	9665	9441	9228	9027	8836	8655	8481	8316	8158	8007	7863	9
10	0.9900	9661	9437	9225	9024	8833	8652	8479	8314	8156	8005	7860	10
11	9895	9658	9433	9221	9021	8830	8649	8476	8311	8153	8002	7858	11
12	9891	9654	9430	9218	9017	8827	8646	8473	8308	8151	8000	7856	12
13	9887	9650	9426	9215	9014	8824	8643	8470	8305	8148	7997	7853	13
14	9883	9646	9423	9211	9011	8821	8640	8467	8303	8145	7995	7851	14
15	0.9879	9642	9419	9208	9008	8818	8637	8465	8300	8143	7993	7848	15
16	9875	9638	9415	9204	9004	8815	8634	8462	8297	8140	7990	7846	16
17	9871	9635	9412	9201	9001	8811	8631	8459	8295	8138	7988	7844	17
18	9867	9631	9408	9198	8998	8808	8628	8456	8292	8135	7985	7841	18
19	9863	9627	9404	9194	8995	8805	8625	8453	8289	8133	7983	7839	19
20	0.9859	9623	9401	9191	8991	8802	8622	8451	8287	8130	7980	7837	20
21	9855	9619	9397	9187	8988	8799	8619	8448	8284	8128	7978	7834	21
22	9851	9616	9394	9184	8985	8796	8616	8445	8281	8125	7975	7832	22
23	9847	9612	9390	9180	8982	8793	8613	8442	8279	8123	7973	7830	23
24	9843	9608	9387	9177	8979	8790	8610	8439	8276	8120	7971	7827	24
25	0.9839	9604	9383	9174	8975	8787	8608	8437	8273	8117	7968	7825	25
26	9835	9600	9379	9170	8972	8784	8605	8434	8271	8115	7966	7823	26
27	9831	9597	9376	9167	8969	8781	8602	8431	8268	8112	7963	7820	27
28	9827	9593	9372	9164	8966	8778	8599	8428	8265	8110	7961	7818	28
29	9823	9589	9369	9160	8962	8775	8596	8425	8263	8107	7958	7816	29
30	0.9819	9585	9365	9157	8959	8772	8593	8423	8260	8105	7956	7813	30
31	9815	9581	9361	9153	8956	8769	8590	8420	8258	8102	7954	7811	31
32	9811	9578	9358	9150	8953	8766	8587	8417	8255	8100	7951	7809	32
33	9807	9574	9354	9147	8950	8762	8584	8414	8252	8097	7949	7806	33
34	9803	9570	9351	9143	8946	8759	8581	8412	8250	8095	7946	7804	34
35	0.9799	9566	9347	9140	8943	8756	8578	8409	8247	8092	7944	7802	35
36	9795	9563	9344	9137	8940	8753	8576	8406	8244	8090	7941	7799	36
37	9791	9559	9340	9133	8937	8750	8573	8403	8242	8087	7939	7797	37
38	9787	9555	9337	9130	8934	8747	8570	8401	8239	8085	7937	7795	38
39	9783	9551	9333	9126	8930	8744	8567	8398	8236	8082	7934	7792	39
40	0.9779	9548	9330	9123	8927	8741	8564	8395	8234	8079	7932	7790	40
41	9775	9544	9326	9120	8924	8738	8561	8392	8231	8077	7929	7788	41
42	9771	9540	9322	9116	8921	8735	8558	8390	8229	8074	7927	7786	42
43	9767	9536	9319	9113	8918	8732	8555	8387	8226	8072	7925	7783	43
44	9763	9533	9315	9110	8915	8729	8553	8384	8223	8069	7922	7781	44
45	0.9759	9529	9312	9106	8911	8726	8550	8381	8221	8067	7920	7779	45
46	9755	9525	9308	9103	8908	8723	8547	8379	8218	8064	7917	7776	46
47	9751	9522	9305	9100	8905	8720	8544	8376	8215	8062	7915	7774	47
48	9747	9518	9301	9096	8902	8717	8541	8373	8213	8059	7913	7772	48
49	9743	9514	9298	9093	8899	8714	8538	8370	8210	8057	7910	7769	49
50	0.9739	9510	9294	9090	8896	8711	8535	8368	8208	8054	7908	7767	50
51	9735	9507	9291	9086	8892	8708	8532	8365	8205	8052	7905	7765	51
52	9731	9503	9287	9083	8889	8705	8530	8362	8202	8049	7903	7763	52
53	9727	9499	9284	9080	8886	8702	8527	8360	8200	8047	7901	7760	53
54	9724	9496	9280	9077	8883	8699	8524	8357	8197	8044	7898	7758	54
55	0.9720	9492	9277	9073	8880	8696	8521	8354	8195	8042	7896	7756	55
56	9716	9488	9273	9070	8877	8693	8518	8351	8192	8039	7893	7753	56
57	9712	9485	9270	9067	8874	8690	8515	8349	8189	8037	7891	7751	57
58	9708	9481	9266	9063	8870	8687	8513	8346	8187	8034	7889	7749	58
59	9704	9477	9263	9060	8867	8684	8510	8343	8184	8032	7886	7747	59
M.	17°	18°	19°	20°	21°	22°	23°	24°	25°	26°	27°	28°	M.

APPARENT ALTITUDES.

TABLE XV.

Logarithms of the Apparent Altitudes.

M.	APPARENT ALTITUDES. 29°	30°	31°	32°	33°	34°	35°	36°	37°	38°	39°	40°	M.
0	0.7744	7610	7482	7358	7239	7124	7014	6908	6805	6707	6611	6519	0
1	7742	7608	7479	7356	7237	7123	7012	6906	6804	6705	6610	6518	1
2	7740	7606	7477	7354	7235	7121	7010	6904	6802	6703	6608	6516	2
3	7737	7604	7475	7352	7233	7119	7009	6903	6800	6702	6607	6515	3
4	7735	7602	7473	7350	7231	7117	7007	6901	6799	6700	6605	6513	4
5	0.7733	7599	7471	7348	7229	7115	7005	6899	6797	6699	6603	6512	5
6	7731	7597	7469	7346	7227	7113	7003	6897	6795	6697	6602	6510	6
7	7728	7595	7467	7344	7225	7111	7001	6896	6794	6695	6600	6509	7
8	7726	7593	7465	7342	7223	7109	7000	6894	6792	6694	6599	6507	8
9	7724	7591	7463	7340	7221	7108	6998	6892	6790	6692	6597	6506	9
10	0.7722	7588	7461	7338	7220	7106	6996	6890	6789	6690	6596	6504	10
11	7719	7586	7459	7336	7218	7104	6994	6889	6787	6689	6594	6503	11
12	7717	7584	7456	7334	7216	7102	6993	6887	6785	6687	6593	6501	12
13	7715	7582	7454	7332	7214	7100	6991	6885	6784	6686	6591	6500	13
14	7713	7580	7452	7330	7212	7098	6989	6884	6782	6684	6590	6498	14
15	0.7710	7578	7450	7328	7210	7096	6987	6882	6780	6682	6588	6497	15
16	7708	7575	7448	7326	7208	7095	6985	6880	6779	6681	6586	6495	16
17	7706	7573	7446	7324	7206	7093	6984	6878	6777	6679	6585	6494	17
18	7704	7571	7444	7322	7204	7091	6982	6877	6775	6678	6583	6492	18
19	7701	7569	7442	7320	7202	7089	6980	6875	6774	6676	6582	6491	19
20	0.7699	7567	7440	7318	7200	7087	6978	6873	6772	6674	6580	6489	20
21	7697	7565	7438	7316	7198	7085	6976	6872	6770	6673	6579	6488	21
22	7695	7563	7436	7314	7196	7083	6975	6870	6769	6671	6577	6486	22
23	7692	7560	7434	7312	7194	7082	6973	6868	6767	6670	6576	6485	23
24	7690	7558	7432	7310	7193	7080	6971	6866	6765	6668	6574	6483	24
25	0.7688	7556	7429	7308	7191	7078	6969	6865	6764	6666	6573	6482	25
26	7686	7554	7427	7306	7189	7076	6968	6863	6762	6665	6571	6480	26
27	7683	7552	7425	7304	7187	7074	6966	6861	6760	6663	6570	6479	27
28	7681	7550	7423	7302	7185	7072	6964	6860	6759	6662	6568	6478	28
29	7679	7547	7421	7300	7183	7071	6962	6858	6757	6660	6566	6476	29
30	0.7677	7545	7419	7298	7181	7069	6960	6856	6756	6658	6565	6475	30
31	7674	7543	7417	7296	7179	7067	6959	6854	6754	6657	6563	6473	31
32	7672	7541	7415	7294	7177	7065	6957	6853	6752	6655	6562	6472	32
33	7670	7539	7413	7292	7175	7063	6955	6851	6751	6654	6560	6470	33
34	7668	7537	7411	7290	7173	7061	6953	6849	6749	6652	6559	6469	34
35	0.7665	7535	7409	7288	7172	7060	6952	6848	6747	6651	6557	6467	35
36	7663	7532	7407	7286	7170	7058	6950	6846	6746	6649	6556	6466	36
37	7661	7530	7405	7284	7168	7056	6948	6844	6744	6647	6554	6464	37
38	7659	7528	7403	7282	7166	7054	6946	6842	6742	6646	6553	6463	38
39	7657	7526	7401	7280	7164	7052	6945	6841	6741	6644	6551	6461	39
40	0.7654	7524	7399	7278	7162	7050	6943	6839	6739	6643	6550	6460	40
41	7652	7522	7397	7276	7160	7049	6941	6837	6737	6641	6548	6458	41
42	7650	7520	7395	7274	7158	7047	6939	6836	6736	6640	6547	6457	42
43	7648	7518	7392	7272	7156	7045	6938	6834	6734	6638	6545	6455	43
44	7645	7515	7390	7270	7154	7043	6936	6832	6733	6636	6544	6454	44
45	0.7643	7513	7388	7268	7153	7041	6934	6831	6731	6635	6542	6452	45
46	7641	7511	7386	7266	7151	7039	6932	6829	6729	6633	6540	6451	46
47	7639	7509	7384	7264	7149	7038	6931	6827	6728	6632	6539	6450	47
48	7637	7507	7382	7262	7147	7036	6929	6826	6726	6630	6537	6448	48
49	7634	7505	7380	7260	7145	7034	6927	6824	6724	6628	6536	6447	49
50	0.7632	7503	7378	7258	7143	7032	6925	6822	6723	6627	6534	6445	50
51	7630	7501	7376	7256	7141	7030	6924	6820	6721	6625	6533	6444	51
52	7628	7498	7374	7255	7139	7029	6922	6819	6720	6624	6531	6442	52
53	7626	7496	7372	7253	7138	7027	6920	6817	6718	6622	6530	6441	53
54	7623	7494	7370	7251	7136	7025	6918	6815	6716	6621	6528	6439	54
55	0.7621	7492	7368	7249	7134	7023	6917	6814	6715	6619	6527	6438	55
56	7619	7490	7366	7247	7132	7021	6915	6812	6713	6618	6525	6436	56
57	7617	7488	7364	7245	7130	7019	6913	6810	6711	6616	6524	6435	57
58	7615	7486	7362	7243	7128	7018	6911	6809	6710	6614	6522	6433	58
59	7612	7484	7360	7241	7126	7016	6910	6807	6708	6613	6521	6432	59
M.	29°	30°	31°	32°	33°	34°	35°	36°	37°	38°	39°	40°	M.
	APPARENT ALTITUDES.												

TABLE XV.

Logarithms of the Apparent Altitudes.

M.	APPARENT ALTITUDES. 41°	42°	43°	44°	45°	46°	47°	48°	49°	50°	51°	52°	M.
0	0.6131	6345	6262	6182	6105	6031	5959	5889	5822	5757	5695	5635	0
1	6129	6343	6261	6181	6104	6029	5958	5888	5821	5756	5694	5634	1
2	6128	6342	6259	6180	6103	6028	5956	5887	5820	5755	5693	5633	2
3	6126	6341	6258	6178	6101	6027	5955	5886	5819	5754	5692	5632	3
4	6125	6339	6257	6177	6100	6026	5954	5885	5818	5753	5691	5631	4
5	0.6423	6338	6255	6176	6099	6025	5953	5884	5817	5752	5690	5630	5
6	6422	6336	6254	6174	6098	6023	5952	5882	5816	5751	5689	5629	6
7	6420	6335	6253	6173	6096	6022	5950	5881	5815	5750	5688	5628	7
8	6419	6334	6251	6172	6095	6021	5949	5880	5813	5749	5687	5627	8
9	6418	6332	6250	6171	6094	6020	5948	5879	5812	5748	5686	5626	9
10	0.6416	6331	6249	6169	6093	6018	5947	5878	5811	5747	5685	5625	10
11	6415	6330	6247	6168	6091	6017	5946	5877	5810	5746	5684	5624	11
12	6413	6328	6246	6167	6090	6016	5945	5876	5809	5745	5683	5623	12
13	6412	6327	6245	6165	6089	6015	5943	5875	5808	5744	5682	5622	13
14	6410	6325	6243	6164	6088	6014	5942	5873	5807	5743	5681	5621	14
15	0.6409	6324	6242	6163	6086	6012	5941	5872	5806	5742	5680	5620	15
16	6407	6323	6241	6161	6085	6011	5940	5871	5805	5741	5679	5619	16
17	6406	6321	6239	6160	6084	6010	5939	5870	5804	5740	5678	5618	17
18	6405	6320	6238	6159	6083	6009	5938	5869	5803	5738	5677	5617	18
19	6403	6318	6237	6158	6081	6008	5936	5868	5801	5737	5676	5616	19
20	0.6402	6317	6235	6156	6080	6006	5935	5867	5800	5736	5675	5615	20
21	6400	6316	6234	6155	6079	6005	5934	5866	5799	5735	5674	5614	21
22	6399	6314	6233	6154	6078	6004	5933	5864	5798	5734	5673	5613	22
23	6397	6313	6231	6152	6076	6003	5932	5863	5797	5733	5672	5612	23
24	6396	6311	6230	6151	6075	6002	5931	5862	5796	5732	5671	5611	24
25	0.6394	6310	6229	6150	6074	6000	5929	5861	5795	5731	5670	5610	25
26	6393	6309	6227	6149	6073	5999	5928	5860	5794	5730	5669	5609	26
27	6392	6307	6226	6147	6071	5998	5927	5859	5793	5729	5668	5608	27
28	6390	6306	6225	6146	6070	5997	5926	5858	5792	5728	5667	5607	28
29	6389	6305	6223	6145	6069	5996	5925	5857	5791	5727	5666	5606	29
30	0.6387	6303	6222	6143	6068	5994	5924	5855	5790	5726	5665	5605	30
31	6386	6302	6221	6142	6066	5993	5923	5854	5788	5725	5664	5604	31
32	6384	6300	6219	6141	6065	5992	5921	5853	5787	5724	5663	5603	32
33	6383	6299	6218	6140	6064	5991	5920	5852	5786	5723	5662	5602	33
34	6382	6298	6217	6138	6063	5990	5919	5851	5785	5722	5661	5601	34
35	0.6380	6296	6215	6137	6061	5988	5918	5850	5784	5721	5660	5600	35
36	6379	6295	6214	6136	6060	5987	5917	5849	5783	5720	5659	5600	36
37	6377	6294	6213	6134	6059	5986	5916	5848	5782	5719	5658	5599	37
38	6376	6292	6211	6133	6058	5985	5914	5847	5781	5718	5657	5598	38
39	6375	6291	6210	6132	6056	5984	5913	5845	5780	5717	5656	5597	39
40	0.6373	6289	6209	6131	6055	5982	5912	5844	5779	5716	5655	5596	40
41	6372	6288	6207	6129	6054	5981	5911	5843	5778	5715	5654	5595	41
42	6370	6287	6206	6128	6053	5980	5910	5842	5777	5713	5653	5594	42
43	6369	6285	6205	6127	6051	5979	5909	5841	5776	5712	5652	5593	43
44	6367	6284	6203	6125	6050	5978	5908	5840	5774	5711	5651	5592	44
45	0.6366	6283	6202	6124	6049	5976	5906	5839	5773	5710	5650	5591	45
46	6365	6281	6201	6123	6048	5975	5905	5838	5772	5709	5649	5590	46
47	6363	6280	6199	6122	6047	5974	5904	5837	5771	5708	5648	5589	47
48	6362	6278	6198	6120	6045	5973	5903	5835	5770	5707	5647	5588	48
49	6360	6277	6197	6119	6044	5972	5902	5834	5769	5706	5646	5587	49
50	0.6359	6276	6195	6118	6043	5971	5901	5833	5768	5705	5645	5586	50
51	6358	6274	6194	6117	6042	5969	5900	5832	5767	5704	5644	5585	51
52	6356	6273	6193	6115	6040	5968	5898	5831	5766	5703	5643	5584	52
53	6355	6272	6191	6114	6039	5967	5897	5830	5765	5702	5642	5583	53
54	6353	6270	6190	6113	6038	5966	5896	5829	5764	5701	5641	5582	54
55	0.6352	6269	6189	6111	6037	5965	5895	5828	5763	5700	5640	5581	55
56	6351	6268	6188	6110	6036	5963	5894	5827	5762	5699	5639	5580	56
57	6349	6266	6186	6109	6034	5962	5893	5825	5761	5698	5638	5579	57
58	6348	6265	6185	6108	6033	5961	5892	5824	5760	5697	5637	5578	58
59	6346	6264	6184	6106	6032	5960	5890	5823	5759	5696	5636	5577	59
M.	41°	42°	43°	44°	45°	46°	47°	48°	49°	50°	51°	52°	M.
	APPARENT ALTITUDES.												

TABLE XV.

Logarithms of the Apparent Altitudes.

M.	APPARENT ALTITUDES. 53°	54°	55°	56°	57°	58°	59°	60°	61°	62°	63°	64°	M.
0	0.5577	5520	5466	5414	5364	5316	5269	5225	5182	5141	5101	5063	0
1	5576	5520	5465	5413	5363	5315	5269	5224	5181	5140	5101	5063	1
2	5575	5519	5465	5413	5362	5314	5268	5223	5180	5139	5100	5062	2
3	5574	5518	5464	5412	5362	5313	5267	5223	5180	5139	5099	5062	3
4	5573	5517	5463	5411	5361	5313	5266	5222	5179	5138	5099	5061	4
5	0.5572	5516	5462	5410	5360	5312	5266	5221	5178	5137	5098	5060	5
6	5571	5515	5461	5409	5359	5311	5265	5220	5178	5137	5097	5060	6
7	5570	5514	5460	5408	5358	5310	5264	5220	5177	5136	5097	5059	7
8	5569	5513	5459	5407	5358	5309	5263	5219	5176	5135	5096	5058	8
9	5568	5512	5458	5407	5357	5309	5263	5218	5176	5135	5095	5058	9
10	0.5567	5511	5458	5406	5356	5308	5262	5217	5175	5134	5095	5057	10
11	5566	5510	5457	5405	5355	5307	5261	5217	5174	5133	5094	5057	11
12	5565	5509	5456	5404	5354	5306	5260	5216	5173	5133	5093	5056	12
13	5564	5509	5455	5403	5353	5306	5260	5215	5173	5132	5093	5055	13
14	5563	5508	5454	5402	5353	5305	5259	5215	5172	5131	5092	5055	14
15	0.5562	5507	5453	5402	5352	5304	5258	5214	5171	5131	5092	5054	15
16	5561	5506	5452	5401	5351	5303	5257	5213	5171	5130	5091	5054	16
17	5560	5505	5451	5400	5350	5302	5257	5212	5170	5129	5090	5053	17
18	5559	5504	5451	5399	5349	5302	5256	5212	5169	5129	5090	5052	18
19	5559	5503	5450	5398	5349	5301	5255	5211	5169	5128	5089	5052	19
20	0.5558	5502	5449	5397	5348	5300	5254	5210	5168	5127	5088	5051	20
21	5557	5501	5448	5396	5347	5299	5254	5209	5167	5127	5088	5051	21
22	5556	5500	5447	5396	5346	5299	5253	5209	5167	5126	5087	5050	22
23	5555	5499	5446	5395	5345	5298	5252	5208	5166	5125	5087	5049	23
24	5554	5499	5445	5394	5345	5297	5251	5207	5165	5125	5086	5049	24
25	0.5553	5498	5444	5393	5344	5296	5251	5207	5164	5124	5085	5048	25
26	5552	5497	5444	5392	5343	5295	5250	5206	5164	5123	5085	5048	26
27	5551	5496	5443	5391	5342	5295	5249	5205	5163	5123	5084	5047	27
28	5550	5495	5442	5391	5341	5294	5248	5204	5162	5122	5083	5046	28
29	5549	5494	5441	5390	5341	5293	5248	5204	5162	5121	5083	5046	29
30	0.5548	5493	5440	5389	5340	5292	5247	5203	5161	5121	5082	5045	30
31	5547	5492	5439	5388	5339	5292	5246	5202	5160	5120	5081	5045	31
32	5546	5491	5438	5387	5338	5291	5245	5201	5160	5119	5081	5044	32
33	5545	5490	5437	5386	5337	5290	5245	5201	5159	5119	5080	5043	33
34	5544	5490	5437	5386	5336	5289	5244	5200	5158	5118	5080	5043	34
35	0.5544	5489	5436	5385	5336	5288	5243	5199	5158	5117	5079	5042	35
36	5543	5488	5435	5384	5335	5288	5242	5199	5157	5117	5078	5042	36
37	5542	5487	5434	5383	5334	5287	5242	5198	5156	5116	5078	5041	37
38	5541	5486	5433	5382	5333	5286	5241	5197	5156	5115	5077	5040	38
39	5540	5485	5432	5381	5332	5285	5240	5197	5155	5115	5076	5040	39
40	0.5539	5484	5431	5381	5332	5285	5239	5196	5154	5114	5076	5039	40
41	5538	5483	5431	5380	5331	5284	5239	5195	5153	5113	5075	5039	41
42	5537	5482	5430	5379	5330	5283	5238	5194	5153	5113	5075	5038	42
43	5536	5481	5429	5378	5329	5282	5237	5194	5152	5112	5074	5037	43
44	5535	5481	5428	5377	5328	5282	5236	5193	5151	5112	5073	5037	44
45	0.5534	5480	5427	5376	5328	5281	5236	5192	5151	5111	5073	5036	45
46	5533	5479	5426	5376	5327	5280	5235	5192	5150	5110	5072	5036	46
47	5532	5478	5425	5375	5326	5279	5234	5191	5149	5110	5071	5035	47
48	5531	5477	5425	5374	5325	5278	5233	5190	5149	5109	5071	5034	48
49	5531	5476	5424	5373	5325	5278	5233	5190	5148	5108	5070	5034	49
50	0.5530	5475	5423	5372	5324	5277	5232	5189	5147	5108	5070	5033	50
51	5529	5474	5422	5371	5323	5276	5231	5188	5147	5107	5069	5033	51
52	5528	5473	5421	5371	5322	5275	5230	5187	5146	5106	5068	5032	52
53	5527	5473	5420	5370	5321	5275	5230	5187	5145	5106	5068	5031	53
54	5526	5472	5419	5369	5321	5274	5229	5186	5145	5105	5067	5031	54
55	0.5525	5471	5419	5368	5320	5273	5228	5185	5144	5104	5066	5030	55
56	5524	5470	5418	5367	5319	5272	5228	5185	5143	5104	5066	5030	56
57	5523	5469	5417	5367	5318	5272	5227	5184	5143	5103	5065	5029	57
58	5522	5468	5416	5366	5317	5271	5226	5183	5142	5102	5065	5028	58
59	5521	5467	5415	5365	5317	5270	5225	5183	5141	5102	5064	5028	59
M.	53°	54°	55°	56°	57°	58°	59°	60°	61°	62°	63°	64°	M.
	APPARENT ALTITUDES												

TABLE XV.

Logarithms of the Apparent Altitudes.

M.	APPARENT ALTITUDES. 65°	66°	67°	68°	69°	70°	71°	72°	73°	74°	75°	76°	M.
0	0.5027	4993	4960	4928	4898	4870	4843	4818	4794	4772	4751	4731	0
1	5027	4992	4959	4928	4898	4870	4843	4818	4794	4771	4750	4731	1
2	5026	4992	4959	4927	4898	4869	4842	4817	4793	4771	4750	4730	2
3	5025	4991	4958	4927	4897	4869	4842	4817	4793	4771	4750	4730	3
4	5025	4990	4958	4926	4897	4868	4842	4816	4792	4770	4749	4730	4
5	0.5024	4990	4957	4926	4896	4868	4841	4816	4792	4770	4749	4729	5
6	5024	4989	4956	4925	4896	4867	4841	4815	4792	4769	4749	4729	6
7	5023	4989	4956	4925	4895	4867	4840	4815	4791	4769	4748	4729	7
8	5023	4988	4955	4924	4895	4866	4840	4815	4791	4769	4748	4728	8
9	5022	4988	4955	4924	4894	4866	4839	4814	4791	4768	4748	4728	9
10	0.5021	4987	4954	4923	4894	4866	4839	4814	4790	4768	4747	4728	10
11	5021	4987	4954	4923	4893	4865	4839	4813	4790	4768	4747	4728	11
12	5020	4986	4953	4922	4893	4865	4838	4813	4789	4767	4747	4727	12
13	5020	4985	4953	4922	4892	4864	4838	4813	4789	4767	4746	4727	13
14	5019	4985	4952	4921	4892	4864	4837	4812	4789	4767	4746	4727	14
15	0.5018	4984	4952	4921	4891	4863	4837	4812	4788	4766	4746	4726	15
16	5018	4984	4951	4920	4891	4863	4836	4811	4788	4766	4745	4726	16
17	5017	4983	4951	4920	4890	4862	4836	4811	4788	4765	4745	4726	17
18	5017	4983	4950	4919	4890	4862	4836	4811	4787	4765	4745	4725	18
19	5016	4982	4950	4919	4889	4861	4835	4810	4787	4765	4744	4725	19
20	0.5016	4982	4949	4918	4889	4861	4835	4810	4786	4764	4744	4725	20
21	5015	4981	4949	4918	4888	4861	4834	4809	4786	4764	4744	4724	21
22	5014	4980	4948	4917	4888	4860	4834	4809	4786	4764	4743	4724	22
23	5014	4980	4948	4917	4887	4860	4833	4809	4785	4763	4743	4724	23
24	5013	4979	4947	4916	4887	4859	4833	4808	4785	4763	4743	4724	24
25	0.5013	4979	4946	4916	4886	4859	4833	4808	4785	4763	4742	4723	25
26	5012	4978	4946	4915	4886	4858	4832	4807	4784	4762	4742	4723	26
27	5011	4978	4945	4915	4886	4858	4832	4807	4784	4762	4742	4723	27
28	5011	4977	4945	4914	4885	4857	4831	4807	4784	4762	4741	4722	28
29	5010	4977	4944	4914	4885	4857	4831	4806	4783	4761	4741	4722	29
30	0.5010	4976	4944	4913	4884	4857	4830	4806	4783	4761	4741	4722	30
31	5009	4975	4943	4913	4884	4856	4830	4805	4782	4761	4740	4721	31
32	5009	4975	4943	4912	4883	4856	4830	4805	4782	4760	4740	4721	32
33	5008	4974	4942	4912	4883	4855	4829	4805	4782	4760	4740	4721	33
34	5007	4974	4942	4911	4882	4855	4829	4804	4781	4760	4739	4720	34
35	0.5007	4973	4941	4911	4882	4854	4828	4804	4781	4759	4739	4720	35
36	5006	4973	4941	4910	4881	4854	4828	4803	4780	4759	4739	4720	36
37	5006	4972	4940	4910	4881	4853	4827	4803	4780	4758	4738	4720	37
38	5005	4972	4940	4909	4880	4853	4827	4803	4780	4758	4738	4719	38
39	5005	4971	4939	4909	4880	4853	4827	4802	4779	4758	4738	4719	39
40	0.5004	4971	4939	4908	4879	4852	4826	4802	4779	4757	4737	4719	40
41	5003	4970	4938	4908	4879	4852	4826	4801	4779	4757	4737	4718	41
42	5003	4969	4938	4907	4878	4851	4825	4801	4778	4757	4737	4718	42
43	5002	4969	4937	4907	4878	4851	4825	4801	4778	4756	4736	4718	43
44	5002	4968	4937	4906	4878	4850	4825	4800	4777	4756	4736	4717	44
45	0.5001	4968	4936	4906	4877	4850	4824	4800	4777	4756	4736	4717	45
46	5001	4967	4936	4905	4877	4849	4824	4799	4777	4755	4735	4717	46
47	5000	4967	4935	4905	4876	4849	4823	4799	4776	4755	4735	4717	47
48	4999	4966	4934	4904	4876	4849	4823	4799	4776	4755	4735	4716	48
49	4999	4966	4934	4904	4875	4848	4822	4798	4776	4754	4734	4716	49
50	0.4998	4965	4933	4903	4875	4848	4822	4798	4775	4754	4734	4716	50
51	4998	4965	4933	4903	4874	4847	4822	4798	4775	4754	4731	4715	51
52	4997	4964	4932	4902	4874	4847	4821	4797	4774	4753	4733	4715	52
53	4997	4963	4932	4902	4873	4846	4821	4797	4774	4753	4733	4715	53
54	4996	4963	4931	4901	4873	4846	4820	4796	4774	4753	4733	4715	54
55	0.4996	4962	4931	4901	4872	4845	4820	4796	4773	4752	4733	4714	55
56	4995	4962	4930	4900	4872	4845	4820	4796	4773	4752	4732	4714	56
57	4994	4961	4930	4900	4872	4845	4819	4795	4773	4752	4732	4714	57
58	4994	4961	4929	4899	4871	4844	4819	4795	4772	4751	4732	4713	58
59	4993	4960	4929	4899	4871	4844	4818	4794	4772	4751	4731	4713	59
M.	65°	66°	67°	68°	69°	70°	71°	72°	73°	74°	75°	76°	M.
	APPARENT ALTITUDES.												

TABLE XV.

Logarithms of the Apparent Altitudes.

M.	APPARENT ALTITUDES. 77°	78°	79°	80°	81°	82°	83°	84°	85°	86°	87°	88°	M.
0	0.4713	4696	4681	4666	4654	4642	4632	4624	4617	4611	4606	4603	0
1	4712	4696	4680	4666	4654	4642	4632	4624	4616	4610	4606	4603	1
2	4712	4695	4680	4666	4653	4642	4632	4624	4616	4610	4606	4603	2
3	4712	4695	4680	4666	4653	4642	4632	4623	4616	4610	4606	4603	3
4	4712	4695	4680	4666	4653	4642	4632	4623	4616	4610	4606	4602	4
5	0.4711	4695	4679	4665	4653	4642	4632	4623	4616	4610	4606	4602	5
6	4711	4694	4679	4665	4653	4641	4632	4623	4616	4610	4606	4602	6
7	4711	4694	4679	4665	4652	4641	4631	4623	4616	4610	4605	4602	7
8	4710	4694	4679	4665	4652	4641	4631	4623	4616	4610	4605	4602	8
9	4710	4694	4678	4664	4652	4641	4631	4623	4616	4610	4605	4602	9
10	0.4710	4693	4678	4664	4652	4641	4631	4623	4615	4610	4605	4602	10
11	4710	4693	4678	4664	4652	4641	4631	4622	4615	4610	4605	4602	11
12	4709	4693	4678	4664	4651	4640	4631	4622	4615	4610	4605	4602	12
13	4709	4693	4677	4664	4651	4640	4631	4622	4615	4609	4605	4602	13
14	4709	4692	4677	4663	4651	4640	4630	4622	4615	4609	4605	4602	14
15	0.4708	4692	4677	4663	4651	4640	4630	4622	4615	4609	4605	4602	15
16	4708	4692	4677	4663	4651	4640	4630	4622	4615	4609	4605	4602	16
17	4708	4691	4676	4663	4650	4640	4630	4622	4615	4609	4605	4602	17
18	4708	4691	4676	4663	4650	4639	4630	4622	4615	4609	4605	4602	18
19	4707	4691	4676	4662	4650	4639	4630	4621	4615	4609	4605	4602	19
20	0.4707	4691	4676	4662	4650	4639	4629	4621	4614	4609	4605	4602	20
21	4707	4690	4675	4662	4650	4639	4629	4621	4614	4609	4605	4602	21
22	4706	4690	4675	4662	4649	4639	4629	4621	4614	4609	4605	4602	22
23	4706	4690	4675	4661	4649	4638	4629	4621	4614	4609	4605	4602	23
24	4706	4690	4675	4661	4649	4638	4629	4621	4614	4609	4604	4602	24
25	0.4706	4689	4675	4661	4649	4638	4629	4621	4614	4608	4604	4602	25
26	4705	4689	4674	4661	4649	4638	4629	4621	4614	4608	4604	4602	26
27	4705	4689	4674	4661	4649	4638	4628	4620	4614	4608	4604	4602	27
28	4705	4689	4674	4660	4648	4638	4628	4620	4614	4608	4604	4602	28
29	4705	4688	4674	4660	4648	4637	4628	4620	4614	4608	4604	4602	29
30	0.4704	4688	4673	4660	4648	4637	4628	4620	4613	4608	4604	4601	30
31	4704	4688	4673	4660	4648	4637	4628	4620	4613	4608	4604	4601	31
32	4704	4688	4673	4660	4648	4637	4628	4620	4613	4608	4604	4601	32
33	4703	4687	4673	4659	4647	4637	4628	4620	4613	4608	4604	4601	33
34	4703	4687	4672	4659	4647	4637	4627	4620	4613	4608	4604	4601	34
35	0.4703	4687	4672	4659	4647	4636	4627	4619	4613	4608	4604	4601	35
36	4703	4687	4672	4659	4647	4636	4627	4619	4613	4608	4604	4601	36
37	4702	4686	4672	4658	4647	4636	4627	4619	4613	4608	4604	4601	37
38	4702	4686	4671	4658	4646	4636	4627	4619	4613	4607	4604	4601	38
39	4702	4686	4671	4658	4646	4636	4627	4619	4613	4607	4604	4601	39
40	0.4701	4686	4671	4658	4646	4636	4627	4619	4612	4607	4604	4601	40
41	4701	4685	4671	4658	4646	4636	4626	4619	4612	4607	4604	4601	41
42	4701	4685	4671	4657	4646	4635	4626	4619	4612	4607	4603	4601	42
43	4701	4685	4670	4657	4646	4635	4626	4618	4612	4607	4603	4601	43
44	4700	4685	4670	4657	4645	4635	4626	4618	4612	4607	4603	4601	44
45	0.4700	4684	4670	4657	4645	4635	4626	4618	4612	4607	4603	4601	45
46	4700	4684	4670	4657	4645	4635	4626	4618	4612	4607	4603	4601	46
47	4699	4684	4669	4656	4645	4635	4626	4618	4612	4607	4603	4601	47
48	4699	4684	4669	4656	4645	4634	4625	4618	4612	4607	4603	4601	48
49	4699	4683	4669	4656	4644	4634	4625	4618	4612	4607	4603	4601	49
50	0.4699	4683	4669	4656	4644	4634	4625	4618	4611	4607	4603	4601	50
51	4698	4683	4669	4656	4644	4634	4625	4618	4611	4607	4603	4601	51
52	4698	4683	4668	4655	4644	4634	4625	4617	4611	4606	4603	4601	52
53	4698	4682	4668	4655	4644	4634	4625	4617	4611	4606	4603	4601	53
54	4698	4682	4668	4655	4644	4633	4625	4617	4611	4606	4603	4601	54
55	0.4697	4682	4668	4655	4643	4633	4625	4617	4611	4606	4603	4601	55
56	4697	4682	4667	4655	4643	4633	4624	4617	4611	4606	4603	4601	56
57	4697	4681	4667	4654	4643	4633	4624	4617	4611	4606	4603	4601	57
58	4696	4681	4667	4654	4643	4633	4624	4617	4611	4606	4603	4601	58
59	4696	4681	4667	4654	4643	4633	4624	4617	4611	4606	4603	4601	59
M.	77°	78°	79°	80°	81°	82°	83°	84°	85°	86°	87°	88°	M.

APPARENT ALTITUDES.

TABLE XVI.

Logarithms of the Apparent Distance.

M.	APPARENT DISTANCE. 18° Log. S.	18° Log. T.	19° Log. S.	19° Log. T.	20° Log. S.	20° Log. T.	21° Log. S.	21° Log. T.	22° Log. S.	22° Log. T.	23° Log. S.	23° Log. T.	M.
0	0.4900	0.5118	0.5126	0.5370	0.5341	0.5611	0.5543	0.5842	0.5736	0.6064	0.5919	0.6279	0
1	4904	5122	5130	5374	5344	5615	5547	5846	5739	6068	5922	6282	1
2	4908	5126	5134	5378	5347	5619	5550	5849	5742	6071	5925	6286	2
3	4911	5131	5137	5382	5351	5622	5553	5853	5745	6075	5928	6289	3
4	4915	5135	5141	5386	5354	5626	5556	5857	5748	6079	5931	6293	4
5	0.4919	0.5139	0.5145	0.5390	0.5358	0.5630	0.5560	0.5861	0.5751	0.6082	0.5934	0.6296	5
6	4923	5143	5148	5394	5361	5634	5563	5864	5754	6086	5937	6300	6
7	4927	5148	5152	5398	5365	5638	5566	5868	5758	6090	5940	6303	7
8	4931	5152	5156	5402	5368	5642	5570	5872	5761	6093	5943	6307	8
9	4935	5156	5159	5407	5372	5646	5573	5876	5764	6097	5945	6310	9
10	0.4939	0.5161	0.5163	0.5411	0.5375	0.5650	0.5576	0.5879	0.5767	0.6100	0.5948	0.6314	10
11	4942	5165	5167	5415	5379	5654	5579	5883	5770	6104	5951	6317	11
12	4946	5169	5170	5419	5382	5658	5583	5887	5773	6108	5954	6321	12
13	4950	5173	5174	5423	5385	5662	5586	5891	5776	6111	5957	6324	13
14	4954	5178	5177	5427	5389	5665	5589	5894	5779	6115	5960	6328	14
15	0.4958	0.5182	0.5181	0.5431	0.5392	0.5669	0.5592	0.5898	0.5782	0.6118	0.5963	0.6331	15
16	4962	5186	5185	5435	5396	5673	5596	5902	5785	6122	5966	6334	16
17	4965	5190	5188	5439	5399	5677	5599	5906	5789	6126	5969	6338	17
18	4969	5195	5192	5443	5402	5681	5602	5909	5792	6129	5972	6341	18
19	4973	5199	5196	5447	5406	5685	5605	5913	5795	6133	5975	6345	19
20	0.4977	0.5203	0.5199	0.5451	0.5409	0.5689	0.5609	0.5917	0.5798	0.6136	0.5978	0.6348	20
21	4981	5207	5203	5455	5413	5693	5612	5921	5801	6140	5981	6352	21
22	4984	5212	5206	5459	5416	5696	5615	5924	5804	6144	5984	6355	22
23	4988	5216	5210	5463	5420	5700	5618	5928	5807	6147	5987	6359	23
24	4992	5220	5213	5467	5423	5704	5621	5932	5810	6151	5990	6362	24
25	0.4996	0.5224	0.5217	0.5471	0.5426	0.5708	0.5625	0.5935	0.5813	0.6154	0.5992	0.6366	25
26	5000	5228	5221	5475	5430	5712	5628	5939	5816	6158	5995	6369	26
27	5003	5233	5224	5479	5433	5716	5631	5943	5819	6162	5998	6373	27
28	5007	5237	5228	5483	5436	5720	5634	5947	5822	6165	6001	6376	28
29	5011	5241	5231	5487	5440	5724	5638	5950	5825	6169	6004	6380	29
30	0.5015	0.5245	0.5235	0.5491	0.5443	0.5727	0.5641	0.5954	0.5828	0.6172	0.6007	0.6383	30
31	5019	5249	5239	5496	5447	5731	5644	5958	5831	6176	6010	6386	31
32	5022	5254	5242	5500	5450	5735	5647	5961	5834	6179	6013	6390	32
33	5026	5258	5246	5504	5453	5739	5650	5965	5838	6183	6016	6393	33
34	5030	5262	5249	5508	5457	5743	5654	5969	5841	6187	6019	6397	34
35	0.5034	0.5266	0.5253	0.5512	0.5460	0.5747	0.5657	0.5972	0.5844	0.6190	0.6022	0.6400	35
36	5037	5270	5256	5516	5463	5750	5660	5976	5847	6194	6024	6404	36
37	5041	5275	5260	5520	5467	5754	5663	5980	5850	6197	6027	6407	37
38	5045	5279	5263	5524	5470	5758	5666	5984	5853	6201	6030	6411	38
39	5049	5283	5267	5528	5474	5762	5670	5987	5856	6204	6033	6414	39
40	0.5052	0.5287	0.5270	0.5531	0.5477	0.5766	0.5673	0.5991	0.5859	0.6208	0.6036	0.6417	40
41	5056	5292	5274	5535	5480	5770	5676	5995	5862	6211	6039	6421	41
42	5060	5295	5278	5539	5484	5773	5679	5998	5865	6215	6042	6424	42
43	5064	5299	5281	5543	5487	5777	5682	6002	5868	6219	6045	6428	43
44	5067	5304	5285	5547	5490	5781	5685	6006	5871	6222	6047	6431	44
45	0.5071	0.5308	0.5288	0.5551	0.5494	0.5785	0.5689	0.6009	0.5874	0.6226	0.6050	0.6435	45
46	5075	5312	5292	5555	5497	5789	5692	6013	5877	6229	6053	6438	46
47	5078	5316	5295	5559	5500	5792	5695	6017	5880	6233	6056	6441	47
48	5082	5320	5299	5563	5504	5796	5698	6020	5883	6236	6059	6445	48
49	5086	5324	5302	5567	5507	5800	5701	6024	5886	6240	6062	6448	49
50	0.5090	0.5329	0.5306	0.5571	0.5510	0.5804	0.5704	0.6028	0.5889	0.6243	0.6065	0.6452	50
51	5093	5333	5309	5575	5514	5808	5708	6031	5892	6247	6068	6455	51
52	5097	5337	5313	5579	5517	5811	5711	6035	5895	6250	6070	6459	52
53	5101	5341	5316	5583	5520	5815	5714	6039	5898	6254	6073	6462	53
54	5104	5345	5320	5587	5523	5819	5717	6042	5901	6257	6076	6465	54
55	0.5108	0.5349	0.5323	0.5591	0.5527	0.5823	0.5720	0.6046	0.5904	0.6261	0.6079	0.6469	55
56	5112	5353	5327	5595	5530	5827	5723	6050	5907	6264	6082	6472	56
57	5115	5357	5330	5599	5533	5830	5726	6053	5910	6268	6085	6476	57
58	5119	5362	5334	5603	5537	5834	5730	6057	5913	6271	6087	6479	58
59	5123	5366	5337	5607	5540	5838	5733	6060	5916	6275	6090	6482	59
60	5126	5370	5341	5611	5543	5842	5736	6064	5919	6279	6093	6486	60
M.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	M.
	18°		19°		20°		21°		22°		23°		

APPARENT DISTANCE.

TABLE XVI.

Logarithms of the Apparent Distance.

M.	APPARENT DISTANCE. 24° Log. S.	24° Log. T.	25° Log. S.	25° Log. T.	26° Log. S.	26° Log. T.	27° Log. S.	27° Log. T.	28° Log. S.	28° Log. T.	29° Log. S.	29° Log. T.	M.
0	0.6093	0.6486	0.6259	0.6687	0.6418	0.6882	0.6570	0.7072	0.6716	0.7257	0.6856	0.7438	0
1	6096	6489	6262	6690	6421	6885	6573	7075	6718	7260	6858	7441	1
2	6099	6493	6265	6693	6424	6888	6575	7078	6721	7263	6860	7443	2
3	6102	6496	6268	6697	6426	6891	6578	7081	6723	7266	6863	7446	3
4	6104	6499	6270	6700	6429	6895	6580	7084	6726	7269	6865	7449	4
5	0.6107	0.6503	0.6273	0.6703	0.6431	0.6898	0.6583	0.7087	0.6728	0.7272	0.6867	0.7452	5
6	6110	6506	6276	6706	6434	6901	6585	7090	6730	7275	6869	7455	6
7	6113	6510	6278	6710	6437	6904	6588	7093	6733	7278	6872	7458	7
8	6116	6513	6281	6713	6439	6907	6590	7097	6735	7281	6874	7461	8
9	6119	6516	6284	6716	6442	6911	6593	7100	6737	7284	6876	7464	9
10	0.6121	0.6520	0.6286	0.6720	0.6444	0.6914	0.6595	0.7103	0.6740	0.7287	0.6878	0.7467	10
11	6124	6523	6289	6723	6447	6917	6598	7106	6742	7290	6881	7470	11
12	6127	6527	6292	6726	6449	6920	6600	7109	6744	7293	6883	7473	12
13	6130	6530	6295	6729	6452	6923	6603	7112	6747	7296	6885	7476	13
14	6133	6533	6297	6733	6455	6927	6605	7115	6749	7299	6887	7479	14
15	0.6135	0.6537	0.6300	0.6736	0.6457	0.6930	0.6607	0.7118	0.6752	0.7302	0.6890	0.7482	15
16	6138	6540	6303	6739	6460	6933	6610	7121	6754	7305	6892	7485	16
17	6141	6543	6305	6743	6462	6936	6612	7125	6756	7308	6894	7488	17
18	6144	6547	6308	6746	6465	6939	6615	7128	6759	7311	6896	7491	18
19	6147	6550	6311	6749	6467	6942	6617	7131	6761	7314	6899	7494	19
20	0.6149	0.6553	0.6313	0.6752	0.6470	0.6946	0.6620	0.7134	0.6763	0.7317	0.6901	0.7497	20
21	6152	6557	6316	6756	6472	6949	6622	7137	6766	7320	6903	7500	21
22	6155	6560	6319	6759	6475	6952	6625	7140	6768	7324	6905	7503	22
23	6158	6564	6321	6762	6477	6955	6627	7143	6770	7327	6908	7506	23
24	6161	6567	6324	6765	6480	6958	6629	7146	6773	7330	6910	7509	24
25	0.6163	0.6570	0.6327	0.6769	0.6483	0.6962	0.6632	0.7149	0.6775	0.7333	0.6912	0.7512	25
26	6166	6574	6329	6772	6485	6965	6634	7152	6777	7336	6914	7515	26
27	6169	6577	6332	6775	6488	6968	6637	7156	6780	7339	6917	7518	27
28	6172	6580	6335	6778	6490	6971	6639	7159	6782	7342	6919	7521	28
29	6175	6584	6337	6782	6493	6974	6642	7162	6784	7345	6921	7523	29
30	0.6177	0.6587	0.6340	0.6785	0.6495	0.6977	0.6644	0.7165	0.6787	0.7348	0.6923	0.7526	30
31	6180	6590	6342	6788	6498	6981	6646	7168	6789	7351	6926	7529	31
32	6183	6594	6345	6791	6500	6984	6649	7171	6791	7354	6928	7532	32
33	6186	6597	6348	6795	6503	6987	6651	7174	6794	7357	6930	7535	33
34	6188	6600	6350	6798	6505	6990	6654	7177	6796	7360	6932	7538	34
35	0.6191	0.6604	0.6353	0.6801	0.6508	0.6993	0.6656	0.7180	0.6798	0.7363	0.6935	0.7541	35
36	6194	6607	6356	6804	6510	6996	6659	7183	6801	7366	6937	7544	36
37	6197	6610	6358	6808	6513	6999	6661	7186	6803	7369	6939	7547	37
38	6199	6614	6361	6811	6515	7003	6663	7189	6805	7372	6941	7550	38
39	6202	6617	6364	6814	6518	7006	6666	7192	6808	7375	6943	7553	39
40	0.6205	0.6620	0.6366	0.6817	0.6521	0.7009	0.6668	0.7196	0.6810	0.7378	0.6946	0.7556	40
41	6208	6624	6369	6821	6523	7012	6671	7199	6812	7381	6948	7559	41
42	6210	6627	6371	6824	6526	7015	6673	7202	6814	7384	6950	7562	42
43	6213	6630	6374	6827	6528	7018	6675	7205	6817	7387	6952	7565	43
44	6216	6634	6377	6830	6531	7022	6678	7208	6819	7390	6954	7568	44
45	0.6219	0.6637	0.6379	0.6834	0.6533	0.7025	0.6680	0.7211	0.6821	0.7393	0.6957	0.7571	45
46	6221	6640	6382	6837	6536	7028	6683	7214	6824	7396	6959	7573	46
47	6224	6644	6385	6840	6538	7031	6685	7217	6826	7399	6961	7576	47
48	6227	6647	6387	6843	6541	7034	6687	7220	6828	7402	6963	7579	48
49	6230	6650	6390	6846	6543	7037	6690	7223	6831	7405	6966	7582	49
50	0.6232	0.6654	0.6392	0.6850	0.6546	0.7040	0.6692	0.7226	0.6833	0.7408	0.6968	0.7585	50
51	6235	6657	6395	6853	6548	7043	6695	7229	6835	7411	6970	7588	51
52	6238	6660	6398	6856	6551	7047	6697	7232	6837	7414	6972	7591	52
53	6240	6664	6400	6859	6553	7050	6699	7235	6840	7417	6974	7594	53
54	6243	6667	6403	6863	6556	7053	6702	7238	6842	7420	6977	7597	54
55	0.6246	0.6670	0.6405	0.6866	0.6558	0.7056	0.6704	0.7241	0.6844	0.7423	0.6979	0.7600	55
56	6249	6674	6408	6869	6561	7059	6707	7245	6847	7426	6981	7603	56
57	6251	6677	6411	6872	6563	7062	6709	7248	6849	7429	6983	7606	57
58	6254	6680	6413	6875	6566	7065	6711	7251	6851	7432	6985	7609	58
59	6257	6683	6416	6879	6568	7069	6714	7254	6853	7435	6988	7611	59
60	6259	6687	6418	6882	6570	7072	6716	7257	6856	7438	6990	7614	60
M.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T	Log. S.	Log. T.	M.
	24°		25°		26°		27°		28°		29°		
	APPARENT DISTANCE.												

TABLE XVI.

Logarithms of the Apparent Distance.

M.	30° Log. S.	30° Log. T.	31° Log. S.	31° Log. T.	32° Log. S.	32° Log. T.	33° Log. S.	33° Log. T.	34° Log. S.	34° Log. T.	35° Log. S.	35° Log. T.	M.
	APPARENT DISTANCE.												
0	0.6990	0.7614	0.7118	0.7788	0.7242	0.7958	0.7361	0.8125	0.7476	0.8290	0.7586	0.8452	0
1	6992	7617	7121	7791	7244	7961	7363	8128	7477	8293	7588	8455	1
2	6994	7620	7123	7793	7246	7964	7365	8131	7479	8295	7590	8458	2
3	6996	7623	7125	7796	7248	7966	7367	8133	7481	8298	7591	8460	3
4	6998	7626	7127	7799	7250	7969	7369	8136	7483	8301	7593	8463	4
5	0.7001	0.7629	0.7129	0.7802	0.7252	0.7972	0.7371	0.8139	0.7485	0.8303	0.7595	0.8466	5
6	7003	7632	7131	7805	7254	7975	7373	8142	7487	8306	7597	8468	6
7	7005	7635	7133	7808	7256	7978	7375	8145	7489	8309	7599	8471	7
8	7007	7638	7135	7811	7258	7980	7377	8147	7491	8312	7600	8474	8
9	7009	7641	7137	7813	7260	7983	7379	8150	7492	8314	7602	8476	9
10	0.7012	0.7644	0.7139	0.7816	0.7262	0.7986	0.7380	0.8153	0.7494	0.8317	0.7604	0.8479	10
11	7014	7646	7141	7819	7264	7989	7382	8156	7496	8320	7606	8482	11
12	7016	7649	7144	7822	7266	7992	7384	8158	7498	8323	7607	8484	12
13	7018	7652	7146	7825	7268	7994	7386	8161	7500	8325	7609	8487	13
14	7020	7655	7148	7828	7270	7997	7388	8164	7502	8328	7611	8490	14
15	0.7022	0.7658	0.7150	0.7831	0.7272	0.8000	0.7390	0.8167	0.7504	0.8331	0.7613	0.8493	15
16	7025	7661	7152	7833	7274	8003	7392	8169	7505	8333	7615	8495	16
17	7027	7664	7154	7836	7276	8006	7394	8172	7507	8336	7616	8498	17
18	7029	7667	7156	7839	7278	8008	7396	8175	7509	8339	7618	8501	18
19	7031	7670	7158	7842	7280	8011	7398	8178	7511	8342	7620	8503	19
20	0.7033	0.7673	0.7160	0.7845	0.7282	0.8014	0.7400	0.8180	0.7513	0.8344	0.7622	0.8506	20
21	7035	7675	7162	7848	7284	8017	7402	8183	7515	8347	7624	8509	21
22	7037	7678	7164	7850	7286	8020	7404	8186	7517	8350	7625	8511	22
23	7040	7681	7166	7853	7288	8022	7406	8189	7518	8352	7627	8514	23
24	7042	7684	7168	7856	7290	8025	7407	8191	7520	8355	7629	8517	24
25	0.7044	0.7687	0.7171	0.7859	0.7292	0.8028	0.7409	0.8194	0.7522	0.8358	0.7631	0.8519	25
26	7046	7690	7173	7862	7294	8031	7411	8197	7524	8361	7632	8522	26
27	7048	7693	7175	7865	7296	8034	7413	8200	7526	8363	7634	8525	27
28	7050	7696	7177	7868	7298	8036	7415	8202	7528	8366	7636	8527	28
29	7053	7699	7179	7870	7300	8039	7417	8205	7529	8369	7638	8530	29
30	0.7055	0.7701	0.7181	0.7873	0.7302	0.8042	0.7419	0.8208	0.7531	0.8371	0.7640	0.8532	30
31	7057	7704	7183	7876	7304	8045	7421	8211	7533	8374	7641	8535	31
32	7059	7707	7185	7879	7306	8047	7423	8213	7535	8377	7643	8538	32
33	7061	7710	7187	7882	7308	8050	7425	8216	7537	8379	7645	8541	33
34	7063	7713	7189	7885	7310	8053	7427	8219	7539	8382	7647	8543	34
35	0.7065	0.7716	0.7191	0.7887	0.7312	0.8056	0.7428	0.8222	0.7540	0.8385	0.7648	0.8546	35
36	7068	7719	7193	7890	7314	8059	7430	8224	7542	8388	7650	8549	36
37	7070	7722	7195	7893	7316	8061	7432	8227	7544	8390	7652	8551	37
38	7072	7725	7197	7896	7318	8064	7434	8230	7546	8393	7654	8554	38
39	7074	7727	7199	7899	7320	8067	7436	8233	7548	8396	7655	8557	39
40	0.7076	0.7730	0.7201	0.7902	0.7322	0.8070	0.7438	0.8235	0.7550	0.8398	0.7657	0.8559	40
41	7078	7733	7203	7904	7324	8072	7440	8238	7551	8401	7659	8562	41
42	7080	7736	7205	7907	7326	8075	7442	8241	7553	8404	7661	8565	42
43	7082	7739	7208	7910	7328	8078	7444	8243	7555	8406	7662	8567	43
44	7085	7742	7210	7913	7330	8081	7446	8246	7557	8409	7664	8570	44
45	0.7087	0.7745	0.7212	0.7916	0.7332	0.8084	0.7447	0.8249	0.7559	0.8412	0.7666	0.8573	45
46	7089	7748	7214	7918	7334	8086	7449	8252	7561	8415	7668	8575	46
47	7091	7750	7216	7921	7336	8089	7451	8254	7562	8417	7669	8578	47
48	7093	7753	7218	7924	7338	8092	7453	8257	7564	8420	7671	8581	48
49	7095	7756	7220	7927	7340	8095	7455	8260	7566	8423	7673	8583	49
50	0.7097	0.7759	0.7222	0.7930	0.7342	0.8097	0.7457	0.8263	0.7568	0.8425	0.7675	0.8586	50
51	7099	7762	7221	7933	7344	8100	7459	8265	7570	8428	7676	8589	51
52	7102	7765	7226	7935	7345	8103	7461	8268	7571	8431	7678	8591	52
53	7104	7768	7228	7938	7347	8106	7462	8271	7573	8433	7680	8594	53
54	7106	7771	7230	7941	7349	8109	7464	8274	7575	8436	7682	8597	54
55	0.7108	0.7773	0.7232	0.7944	0.7351	0.8111	0.7466	0.8276	0.7577	0.8439	0.7683	0.8599	55
56	7110	7776	7234	7947	7353	8114	7468	8279	7579	8442	7685	8602	56
57	7112	7779	7236	7949	7355	8117	7470	8282	7581	8444	7687	8605	57
58	7114	7782	7238	7952	7357	8120	7472	8284	7582	8447	7689	8607	58
59	7116	7785	7240	7955	7359	8122	7474	8287	7584	8450	7690	8610	59
60	7118	7788	7242	7958	7361	8125	7476	8290	7586	8452	7692	8613	60
M.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	M.
	30°		31°		32°		33°		34°		35°		
	APPARENT DISTANCE.												

TABLE XVI.

Logarithms of the Apparent Distance.

M.	APPARENT DISTANCE. 36° Log. S.	36° Log. T.	37° Log. S.	37° Log. T.	38° Log. S.	38° Log. T.	39° Log. S.	39° Log. T.	40° Log. S.	40° Log. T.	41° Log. S.	41° Log. T.	M.
0	0.7692	0.8613	0.7795	0.8771	0.7893	0.8928	0.7989	0.9084	0.8081	0.9238	0.8169	0.9392	0
1	7694	8615	7796	8774	7895	8931	7990	9086	8082	9241	8171	9394	1
2	7696	8618	7798	8776	7897	8933	7992	9089	8084	9243	8172	9397	2
3	7697	8621	7800	8779	7898	8936	7993	9091	8085	9246	8174	9399	3
4	7699	8623	7801	8782	7900	8939	7995	9094	8087	9248	8175	9402	4
5	0.7701	0.8626	0.7803	0.8784	0.7901	0.8941	0.7997	0.9097	0.8088	0.9251	0.8177	0.9404	5
6	7703	8629	7805	8787	7903	8944	7998	9099	8090	9254	8178	9407	6
7	7704	8631	7806	8790	7905	8946	8000	9102	8091	9256	8180	9409	7
8	7706	8634	7808	8792	7906	8949	8001	9104	8093	9259	8181	9412	8
9	7708	8637	7810	8795	7908	8952	8003	9107	8094	9261	8182	9415	9
10	0.7710	0.8639	0.7811	0.8797	0.7910	0.8954	0.8004	0.9110	0.8096	0.9264	0.8184	0.9417	10
11	7711	8642	7813	8800	7911	8957	8006	9112	8097	9266	8185	9420	11
12	7713	8644	7815	8803	7913	8959	8007	9115	8099	9269	8187	9422	12
13	7715	8647	7816	8805	7914	8962	8009	9117	8100	9271	8188	9425	13
14	7716	8650	7818	8808	7916	8965	8010	9120	8102	9274	8190	9427	14
15	0.7718	0.8652	0.7820	0.8811	0.7918	0.8967	0.8012	0.9122	0.8103	0.9277	0.8191	0.9430	15
16	7720	8655	7821	8813	7919	8970	8014	9125	8105	9279	8193	9432	16
17	7722	8658	7823	8816	7921	8972	8015	9128	8106	9282	8194	9435	17
18	7723	8660	7825	8818	7922	8975	8017	9130	8108	9284	8195	9438	18
19	7725	8663	7826	8821	7924	8978	8018	9133	8109	9287	8197	9440	19
20	0.7727	0.8666	0.7828	0.8824	0.7926	0.8980	0.8020	0.9135	0.8111	0.9289	0.8198	0.9443	20
21	7728	8668	7830	8826	7927	8983	8021	9138	8112	9292	8200	9445	21
22	7730	8671	7831	8829	7929	8985	8023	9140	8114	9295	8201	9448	22
23	7732	8674	7833	8831	7930	8988	8024	9143	8115	9297	8203	9450	23
24	7734	8676	7835	8834	7932	8990	8026	9146	8117	9300	8204	9453	24
25	0.7735	0.8679	0.7836	0.8837	0.7934	0.8993	0.8027	0.9148	0.8118	0.9302	0.8206	0.9455	25
26	7737	8682	7838	8839	7935	8996	8029	9151	8120	9305	8207	9458	26
27	7739	8684	7840	8842	7937	8998	8031	9153	8121	9307	8208	9460	27
28	7740	8687	7841	8845	7938	9001	8032	9156	8122	9310	8210	9463	28
29	7742	8689	7843	8847	7940	9003	8034	9158	8124	9312	8211	9466	29
30	0.7744	0.8692	0.7844	0.8850	0.7942	0.9006	0.8035	0.9161	0.8125	0.9315	0.8213	0.9468	30
31	7746	8695	7846	8852	7943	9009	8037	9164	8127	9318	8214	9471	31
32	7747	8697	7848	8855	7945	9011	8038	9166	8128	9320	8216	9473	32
33	7749	8700	7849	8858	7946	9014	8040	9169	8130	9323	8217	9476	33
34	7751	8703	7851	8860	7948	9016	8041	9171	8131	9325	8218	9478	34
35	0.7752	0.8705	0.7853	0.8863	0.7949	0.9019	0.8043	0.9174	0.8133	0.9328	0.8220	0.9481	35
36	7754	8708	7854	8865	7951	9022	8044	9176	8134	9330	8221	9483	36
37	7756	8711	7856	8868	7953	9024	8046	9179	8136	9333	8223	9486	37
38	7758	8713	7858	8871	7954	9026	8047	9182	8137	9335	8224	9488	38
39	7759	8716	7859	8873	7956	9029	8049	9184	8139	9338	8225	9491	39
40	0.7761	0.8718	0.7861	0.8876	0.7957	0.9032	0.8050	0.9187	0.8140	0.9341	0.8227	0.9494	40
41	7763	8721	7863	8879	7959	9035	8052	9189	8142	9343	8228	9496	41
42	7764	8724	7864	8881	7960	9037	8053	9192	8143	9346	8230	9499	42
43	7766	8726	7866	8884	7962	9040	8055	9194	8145	9348	8231	9501	43
44	7768	8729	7867	8886	7964	9042	8056	9197	8146	9351	8233	9504	44
45	0.7769	0.8732	0.7869	0.8889	0.7965	0.9045	0.8058	0.9200	0.8148	0.9353	0.8234	0.9506	45
46	7771	8734	7871	8892	7967	9048	8060	9202	8149	9356	8235	9509	46
47	7773	8737	7872	8894	7968	9050	8061	9205	8150	9358	8237	9511	47
48	7774	8740	7874	8897	7970	9053	8063	9207	8152	9361	8238	9514	48
49	7776	8742	7876	8899	7972	9055	8064	9210	8153	9364	8240	9516	49
50	0.7778	0.8745	0.7877	0.8902	0.7973	0.9057	0.8066	0.9212	0.8155	0.9366	0.8241	0.9519	50
51	7780	8747	7879	8905	7975	9060	8067	9215	8156	9369	8242	9522	51
52	7781	8750	7880	8907	7976	9063	8069	9218	8158	9371	8244	9521	52
53	7783	8753	7882	8910	7978	9066	8070	9220	8159	9374	8245	9527	53
54	7785	8755	7884	8912	7979	9068	8072	9223	8161	9376	8247	9529	54
55	0.7786	0.8758	0.7885	0.8915	0.7981	0.9071	0.8073	0.9225	0.8162	0.9379	0.8248	0.9532	55
56	7788	8761	7887	8918	7982	9073	8075	9228	8164	9381	8249	9534	56
57	7790	8763	7889	8920	7984	9076	8076	9230	8165	9384	8251	9537	57
58	7791	8766	7890	8923	7986	9079	8078	9233	8167	9387	8252	9529	58
59	7793	8769	7892	8925	7987	9081	8079	9236	8168	9389	8254	9542	59
60	7795	8771	7893	8928	7989	9084	8081	9238	8169	9392	8255	9544	60
M.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	M.
	36°		37°		38°		39°		40°		41°		

APPARENT DISTANCE.

TABLE XVI.

Logarithms of the Apparent Distance.

M.	APPARENT DISTANCE. 42° Log. S.	42° Log. T.	43° Log. S.	43° Log. T.	44° Log. S.	44° Log. T.	45° Log. S.	45° Log. T.	46° Log. S.	46° Log. T.	47° Log. S.	47° Log. T.	M.
0	0.8255	0.9544	0.8338	0.9697	0.8418	0.9842	0.8495	1.0000	0.8569	1.0152	0.8641	1.0303	0
1	8257	9547	8339	9699	8419	9851	8496	0003	8571	0154	8642	0306	1
2	8258	9549	8341	9702	8420	9853	8497	0005	8572	0157	8644	0309	2
3	8259	9552	8342	9704	8422	9856	8499	0008	8573	0159	8645	0311	3
4	8261	9555	8343	9707	8423	9858	8500	0010	8574	0162	8646	0314	4
5	0.8262	0.9557	0.8345	0.9709	0.8424	0.9861	0.8501	1.0013	0.8575	1.0164	0.8647	1.0316	5
6	8264	9560	8346	9712	8426	9864	8502	0015	8577	0167	8648	0319	6
7	8265	9562	8347	9714	8427	9866	8504	0018	8578	0169	8650	0321	7
8	8266	9565	8349	9717	8428	9869	8505	0020	8579	0172	8651	0324	8
9	8268	9567	8350	9719	8429	9871	8506	0023	8580	0174	8652	0326	9
10	0.8269	0.9570	0.8351	0.9722	0.8431	0.9874	0.8507	1.0025	0.8582	1.0177	0.8653	1.0329	10
11	8270	9572	8353	9724	8432	9876	8509	0028	8583	0179	8654	0331	11
12	8272	9575	8354	9727	8433	9879	8510	0030	8584	0182	8655	0334	12
13	8273	9577	8355	9729	8435	9881	8511	0033	8585	0185	8657	0336	13
14	8275	9580	8357	9732	8436	9884	8512	0035	8586	0187	8658	0339	14
15	0.8276	0.9582	0.8358	0.9735	0.8437	0.9886	0.8514	1.0038	0.8588	1.0190	0.8659	1.0341	15
16	8277	9585	8359	9737	8439	9889	8515	0040	8589	0192	8660	0344	16
17	8279	9588	8361	9740	8440	9891	8516	0043	8590	0195	8661	0347	17
18	8280	9590	8362	9742	8441	9894	8517	0045	8591	0197	8662	0349	18
19	8282	9593	8363	9745	8442	9896	8519	0048	8592	0200	8663	0352	19
20	0.8283	0.9595	0.8365	0.9747	0.8444	0.9899	0.8520	1.0051	0.8594	1.0202	0.8665	1.0354	20
21	8284	9598	8366	9750	8445	9901	8521	0053	8595	0205	8666	0357	21
22	8286	9600	8367	9752	8446	9904	8522	0056	8596	0207	8667	0359	22
23	8287	9603	8369	9755	8448	9907	8524	0058	8597	0210	8668	0362	23
24	8289	9605	8370	9757	8449	9909	8525	0061	8598	0212	8669	0364	24
25	0.8290	0.9608	0.8371	0.9760	0.8450	0.9912	0.8526	1.0063	0.8600	1.0215	0.8671	1.0367	25
26	8291	9610	8373	9762	8451	9914	8527	0066	8601	0217	8672	0369	26
27	8293	9613	8374	9765	8453	9917	8529	0068	8602	0220	8673	0372	27
28	8294	9615	8375	9767	8454	9919	8530	0071	8603	0222	8674	0374	28
29	8295	9618	8377	9770	8455	9922	8531	0073	8604	0225	8675	0377	29
30	0.8297	0.9621	0.8378	0.9773	0.8457	0.9924	0.8532	1.0076	0.8606	1.0228	0.8676	1.0379	30
31	8298	9623	8379	9775	8458	9927	8534	0078	8607	0230	8677	0382	31
32	8300	9626	8381	9778	8459	9929	8535	0081	8608	0233	8679	0385	32
33	8301	9628	8382	9780	8460	9932	8536	0083	8609	0235	8680	0387	33
34	8302	9631	8383	9783	8462	9934	8537	0086	8610	0238	8681	0390	34
35	0.8304	0.9633	0.8385	0.9785	0.8463	0.9937	0.8539	1.0088	0.8612	1.0240	0.8682	1.0392	35
36	8305	9636	8386	9788	8464	9939	8540	0091	8613	0243	8683	0395	36
37	8306	9638	8387	9790	8466	9942	8541	0093	8614	0245	8684	0397	37
38	8308	9641	8389	9793	8467	9944	8542	0096	8615	0248	8686	0400	38
39	8309	9643	8390	9795	8468	9947	8544	0099	8616	0250	8687	0402	39
40	0.8311	0.9646	0.8391	0.9798	0.8469	0.9949	0.8545	1.0101	0.8618	1.0253	0.8688	1.0405	40
41	8312	9648	8393	9800	8471	9952	8546	0104	8619	0255	8689	0407	41
42	8313	9651	8394	9803	8472	9955	8547	0106	8620	0258	8690	0410	42
43	8315	9653	8395	9805	8473	9957	8549	0109	8621	0260	8691	0412	43
44	8316	9656	8397	9808	8475	9960	8550	0111	8622	0263	8692	0415	44
45	0.8317	0.9659	0.8398	0.9810	0.8476	0.9962	0.8551	1.0114	0.8624	1.0265	0.8694	1.0418	45
46	8319	9661	8399	9813	8477	9965	8552	0116	8625	0268	8695	0420	46
47	8320	9664	8401	9816	8478	9967	8553	0119	8626	0271	8696	0423	47
48	8322	9666	8402	9818	8480	9970	8555	0121	8627	0273	8697	0425	48
49	8323	9669	8403	9821	8481	9972	8556	0124	8628	0276	8698	0428	49
50	0.8324	0.9671	0.8405	0.9823	0.8482	0.9975	0.8557	1.0126	0.8629	1.0278	0.8699	1.0430	50
51	8326	9674	8406	9826	8483	9977	8558	0129	8631	0281	8700	0433	51
52	8327	9676	8407	9828	8485	9980	8560	0131	8632	0283	8702	0435	52
53	8328	9679	8409	9831	8486	9982	8561	0134	8633	0286	8703	0438	53
54	8330	9681	8410	9833	8487	9985	8562	0136	8634	0288	8704	0440	54
55	0.8331	0.9684	0.8411	0.9836	0.8489	0.9987	0.8563	1.0139	0.8635	1.0291	0.8705	1.0443	55
56	8332	9686	8412	9838	8490	9990	8564	0142	8637	0293	8706	0445	56
57	8334	9689	8414	9841	8491	9992	8566	0144	8638	0296	8707	0448	57
58	8335	9691	8415	9843	8492	9995	8567	0147	8639	0298	8708	0451	58
59	8336	9694	8416	9846	8494	9997	8568	0149	8640	0301	8710	0453	59
60	8338	9697	8418	9848	8495	1.0000	8569	0152	8641	0303	8711	0456	60
M.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	M.
	42°		43°		44°		45°		46°		47°		
	APPARENT DISTANCE.												

TABLE XVI.

Logarithms of the Apparent Distance.

M.	APPARENT DISTANCE. 48° Log. S.	48° Log. T.	49° Log. S.	49° Log. T.	50° Log. S.	50° Log. T.	51° Log. S.	51° Log. T.	52° Log. S.	52° Log. T.	53° Log. S.	53° Log. T.	M.
0	0.8711	1.0456	0.8778	1.0608	0.8843	1.0762	0.8905	1.0916	0.8965	1.1072	0.9023	1.1229	0
1	8712	0458	8779	0611	8844	0764	8906	0919	8966	1075	9024	1231	1
2	8713	0461	8780	0613	8845	0767	8907	0921	8967	1077	9025	1234	2
3	8714	0463	8781	0616	8846	0770	8908	0924	8968	1080	9026	1237	3
4	8715	0466	8782	0619	8847	0772	8909	0927	8969	1082	9027	1239	4
5	0.8716	1.0468	0.8783	1.0621	0.8848	1.0775	0.8910	1.0929	0.8970	1.1085	0.9028	1.1242	5
6	8718	0471	8784	0624	8849	0777	8911	0932	8971	1088	9029	1245	6
7	8719	0473	8785	0626	8850	0780	8912	0934	8972	1090	9030	1247	7
8	8720	0476	8787	0629	8851	0782	8913	0937	8973	1093	9031	1250	8
9	8721	0479	8788	0631	8852	0785	8914	0940	8974	1095	9032	1253	9
10	0.8722	1.0481	0.8789	1.0634	0.8853	1.0788	0.8915	1.0942	0.8975	1.1098	0.9033	1.1255	10
11	8723	0484	8790	0636	8854	0790	8916	0945	8976	1101	9034	1258	11
12	8724	0486	8791	0639	8855	0793	8917	0947	8977	1103	9035	1260	12
13	8725	0489	8792	0642	8856	0795	8918	0950	8978	1106	9036	1263	13
14	8727	0491	8793	0644	8857	0798	8919	0953	8979	1108	9037	1266	14
15	0.8728	1.0494	0.8794	1.0647	0.8858	1.0800	0.8920	1.0955	0.8980	1.1111	0.9038	1.1268	15
16	8729	0496	8795	0649	8859	0803	8921	0958	8981	1114	9039	1271	16
17	8730	0499	8796	0652	8860	0806	8922	0960	8982	1116	9040	1274	17
18	8731	0501	8797	0654	8862	0808	8923	0963	8983	1119	9041	1276	18
19	8732	0504	8799	0657	8863	0811	8924	0965	8984	1121	9041	1279	19
20	0.8733	1.0506	0.8800	1.0659	0.8864	1.0813	0.8925	1.0968	0.8985	1.1124	0.9042	1.1282	20
21	8734	0509	8801	0662	8865	0816	8926	0971	8986	1127	9043	1284	21
22	8736	0512	8802	0665	8866	0818	8927	0973	8987	1129	9044	1287	22
23	8737	0514	8803	0667	8867	0821	8928	0976	8988	1132	9045	1289	23
24	8738	0517	8804	0670	8868	0824	8929	0978	8989	1135	9046	1292	24
25	0.8739	1.0519	0.8805	1.0672	0.8869	1.0826	0.8930	1.0981	0.8990	1.1137	0.9047	1.1295	25
26	8740	0522	8806	0675	8870	0829	8931	0984	8991	1140	9048	1297	26
27	8741	0524	8807	0677	8871	0831	8932	0986	8992	1142	9049	1300	27
28	8742	0527	8808	0680	8872	0834	8933	0989	8993	1145	9050	1303	28
29	8743	0529	8809	0682	8873	0836	8934	0991	8994	1148	9051	1305	29
30	0.8745	1.0532	0.8810	1.0685	0.8874	1.0839	0.8935	1.0994	0.8995	1.1150	0.9052	1.1308	30
31	8746	0534	8812	0688	8875	0842	8936	0997	8996	1153	9053	1311	31
32	8747	0537	8813	0690	8876	0844	8937	0999	8997	1155	9054	1313	32
33	8748	0540	8814	0693	8877	0847	8938	1002	8998	1158	9055	1316	33
34	8749	0542	8815	0695	8878	0849	8939	1004	8999	1161	9056	1318	34
35	0.8750	1.0545	0.8816	1.0698	0.8879	1.0852	0.8940	1.1007	0.9000	1.1163	0.9056	1.1321	35
36	8751	0547	8817	0700	8880	0854	8941	1010	9000	1166	9057	1324	36
37	8752	0550	8818	0703	8881	0857	8942	1012	9001	1169	9058	1326	37
38	8753	0552	8819	0705	8882	0860	8943	1015	9002	1171	9059	1329	38
39	8755	0555	8820	0708	8883	0862	8944	1017	9003	1174	9060	1332	39
40	0.8756	1.0557	0.8821	1.0711	0.8884	1.0865	0.8945	1.1020	0.9004	1.1176	0.9061	1.1334	40
41	8757	0560	8822	0713	8885	0867	8946	1022	9005	1179	9062	1337	41
42	8758	0562	8823	0716	8887	0870	8947	1025	9006	1182	9063	1340	42
43	8759	0565	8824	0718	8888	0872	8948	1028	9007	1184	9064	1342	43
44	8760	0568	8825	0721	8889	0875	8949	1030	9008	1187	9065	1345	44
45	0.8761	1.0570	0.8827	1.0723	0.8890	1.0878	0.8950	1.1033	0.9009	1.1189	0.9066	1.1348	45
46	8762	0573	8828	0726	8891	0880	8951	1035	9010	1192	9067	1350	46
47	8763	0575	8829	0729	8892	0883	8952	1038	9011	1195	9068	1353	47
48	8765	0578	8830	0731	8893	0885	8953	1041	9012	1197	9069	1356	48
49	8766	0580	8831	0734	8894	0888	8954	1043	9013	1200	9069	1358	49
50	0.8767	1.0583	0.8832	1.0736	0.8895	1.0890	0.8955	1.1046	0.9014	1.1203	0.9070	1.1361	50
51	8768	0585	8833	0739	8896	0893	8956	1048	9015	1205	9071	1364	51
52	8769	0588	8834	0741	8897	0896	8957	1051	9016	1208	9072	1366	52
53	8770	0591	8835	0744	8898	0898	8958	1054	9017	1210	9073	1369	53
54	8771	0593	8836	0746	8899	0901	8959	1056	9018	1213	9074	1371	54
55	0.8772	1.0596	0.8837	1.0749	0.8900	1.0903	0.8960	1.1059	0.9019	1.1216	0.9075	1.1374	55
56	8773	0598	8838	0752	8901	0906	8961	1061	9020	1218	9076	1377	56
57	8775	0601	8839	0754	8902	0909	8962	1064	9021	1221	9077	1379	57
58	8776	0603	8840	0757	8903	0911	8963	1067	9022	1224	9078	1382	58
59	8777	0606	8841	0759	8904	0914	8964	1069	9023	1226	9079	1385	59
60	8778	0608	8843	0762	8905	0916	8965	1072	9023	1229	9080	1387	60
M.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	M.
	48°		49°		50°		51°		52°		53°		
	APPARENT DISTANCE.												

TABLE XVI

Logarithms of the Apparent Distance.

M.	APPARENT DIS'ANCE. 54° Log. S.	54° Log. T.	55° Log. S.	55° Log. T.	56° Log. S.	56° Log. T.	57° Log. S.	57° Log. T.	58° Log. S	58° Log. T.	59° Log. S.	59° Log. T.	
0	0.9080	1.1387	0.9134	1.1548	0.9186	1.1710	0.9236	1.1875	0.9284	1.2042	0.9331	1.2212	60
1	9080	1390	9135	1550	9187	1713	9237	1878	9285	2045	9331	2215	59
2	9081	1393	9135	1553	9187	1716	9238	1880	9286	2048	9332	2218	58
3	9082	1395	9136	1556	9188	1718	9238	1883	9287	2051	9333	2221	57
4	9083	1398	9137	1558	9189	1721	9239	1886	9287	2053	9334	2224	56
5	0.9084	1.1401	0.9138	1.1561	0.9190	1.1724	0.9240	1.1889	0.9288	1.2056	0.9334	1.2227	55
6	9085	1403	9139	1564	9191	1726	9241	1891	9289	2059	9335	2229	54
7	9086	1406	9140	1567	9192	1729	9242	1894	9290	2062	9336	2232	53
8	9087	1409	9141	1569	9193	1732	9242	1897	9291	2065	9337	2235	52
9	9088	1411	9142	1572	9193	1735	9243	1900	9291	2067	9337	2238	51
10	0.9089	1.1414	0.9142	1.1575	0.9194	1.1737	0.9244	1.1903	0.9292	1.2070	0.9338	1.2241	50
11	9090	1417	9143	1577	9195	1740	9245	1905	9293	2073	9339	2244	49
12	9091	1419	9144	1583	9196	1743	9246	1908	9294	2076	9340	2247	48
13	9091	1422	9145	1583	9197	1746	9247	1911	9294	2079	9340	2250	47
14	9092	1425	9146	1585	9198	1748	9247	1914	9295	2082	9341	2252	46
15	0.9093	1.1427	0.9147	1.1588	0.9198	1.1751	0.9248	1.1916	0.9296	1.2084	0.9342	1.2255	45
16	9094	1430	9148	1591	9199	1754	9249	1919	9297	2087	9343	2258	44
17	9095	1433	9149	1594	9200	1757	9250	1922	9298	2090	9343	2261	43
18	9096	1435	9149	1596	9201	1759	9251	1925	9298	2093	9344	2264	42
19	9097	1438	9150	1599	9202	1762	9251	1928	9299	2096	9345	2267	41
20	0.9098	1.1441	0.9151	1.1602	0.9203	1.1765	0.9252	1.1930	0.9300	1.2098	0.9346	1.2270	40
21	9099	1443	9152	1604	9204	1767	9253	1933	9301	2101	9346	2273	39
22	9100	1446	9153	1607	9204	1770	9254	1936	9301	2104	9347	2275	38
23	9101	1449	9154	1610	9205	1773	9255	1939	9302	2107	9348	2278	37
24	9101	1451	9155	1612	9206	1776	9255	1941	9303	2110	9349	2281	36
25	0.9102	1.1454	0.9156	1.1615	0.9207	1.1778	0.9256	1.1944	0.9304	1.2113	0.9349	1.2284	35
26	9103	1457	9156	1618	9208	1781	9257	1947	9305	2115	9350	2287	34
27	9104	1459	9157	1621	9209	1784	9258	1950	9305	2118	9351	2290	33
28	9105	1462	9158	1623	9209	1787	9259	1953	9306	2121	9352	2293	32
29	9106	1465	9159	1626	9210	1789	9259	1955	9307	2124	9352	2296	31
30	0.9107	1.1467	0.9160	1.1629	0.9211	1.1792	0.9260	1.1958	0.9308	1.2127	0.9353	1.2299	30
31	9108	1470	9161	1631	9212	1795	9261	1961	9308	2130	9354	2301	29
32	9109	1473	9162	1634	9213	1798	9262	1964	9309	2132	9355	2304	28
33	9110	1475	9163	1637	9214	1800	9263	1966	9310	2135	9355	2307	27
34	9110	1478	9163	1639	9214	1803	9264	1969	9311	2138	9356	2310	26
35	0.9111	1.1481	0.9164	1.1642	0.9215	1.1806	0.9264	1.1972	0.9312	1.2141	0.9357	1.2313	25
36	9112	1483	9165	1645	9216	1809	9265	1975	9312	2144	9358	2316	24
37	9113	1486	9166	1648	9217	1811	9266	1978	9313	2147	9358	2319	23
38	9114	1489	9167	1650	9218	1814	9267	1980	9314	2150	9359	2322	22
39	9115	1491	9168	1653	9219	1817	9268	1983	9315	2152	9360	2325	21
40	0.9116	1.1494	0.9169	1.1656	0.9219	1.1820	0.9268	1.1986	0.9315	1.2155	0.9361	1.2327	20
41	9117	1497	9169	1658	9220	1822	9269	1989	9316	2158	9361	2330	19
42	9118	1499	9170	1661	9221	1825	9270	1992	9317	2161	9362	2333	18
43	9119	1502	9171	1664	9222	1828	9271	1994	9318	2164	9363	2336	17
44	9119	1505	9172	1667	9223	1831	9272	1997	9318	2167	9364	2339	16
45	0.9120	1.1507	0.9173	1.1669	0.9224	1.1833	0.9272	1.2000	0.9319	1.2169	0.9364	1.2342	15
46	9121	1510	9174	1672	9224	1836	9273	2003	9320	2172	9365	2345	14
47	9122	1513	9175	1675	9225	1839	9274	2006	9321	2175	9366	2348	13
48	9123	1516	9175	1677	9226	1842	9275	2008	9322	2178	9367	2351	12
49	9124	1518	9176	1680	9227	1844	9275	2011	9322	2181	9367	2354	11
50	0.9125	1.1521	0.9177	1.1683	0.9228	1.1847	0.9276	1.2014	0.9323	1.2184	0.9368	1.2356	10
51	9126	1524	9178	1686	9229	1850	9277	2017	9324	2187	9369	2359	9
52	9127	1526	9179	1688	9229	1853	9278	2020	9325	2189	9369	2362	8
53	9127	1529	9180	1691	9230	1855	9279	2022	9325	2192	9370	2365	7
54	9128	1532	9181	1694	9231	1858	9279	2025	9326	2195	9371	2368	6
55	0.9129	1.1534	0.9181	1.1697	0.9232	1.1861	0.9280	1.2028	0.9327	1.2198	0.9372	1.2371	5
56	9130	1537	9182	1699	9233	1864	9281	2031	9328	2201	9372	2374	4
57	9131	1540	9183	1702	9233	1867	9282	2034	9328	2204	9373	2377	3
58	9132	1542	9184	1705	9234	1869	9283	2036	9329	2207	9374	2380	2
59	9133	1545	9185	1707	9235	1872	9283	2039	9330	2209	9375	2383	1
60	9134	1548	9186	1710	9236	1875	9284	2042	9331	2212	9375	2386	0
	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	M.
	125°		124°		123°		122°		121°		120°		

APPARENT DISTANCE

TABLE XVI.

Logarithms of the Apparent Distance.

M.	APPARENT DISTANCE. 60° Log. S.	60° Log. T.	61° Log. S.	61° Log. T.	62° Log. S.	62° Log. T.	63° Log. S.	63° Log. T.	64° Log. S	64° Log. T.	65° Log. S.	65° Log. T.	
0	0.9375	1.2386	0.9418	1.2562	0.9459	1.2743	0.9499	1.2928	0.9537	1.3118	0.9573	1.3313	60
1	9376	2389	9419	2565	9460	2746	9499	2931	9537	3121	9573	3317	59
2	9377	2391	9420	2568	9461	2749	9500	2935	9538	3125	9574	3320	58
3	9377	2394	9420	2571	9461	2752	9501	2938	9538	3128	9575	3323	57
4	9378	2397	9421	2574	9462	2755	9501	2941	9539	3131	9575	3326	56
5	0.9379	1.2400	0.9422	1.2577	0.9463	1.2759	0.9502	1.2944	0.9540	1.3134	0.9576	1.3330	55
6	9380	2403	9422	2580	9463	2762	9503	2947	9540	3137	9576	3333	54
7	9380	2406	9423	2583	9464	2765	9503	2950	9541	3141	9577	3336	53
8	9381	2409	9124	2586	9465	2768	9504	2953	9542	3144	9577	3340	52
9	9382	2412	9424	2589	9465	2771	9505	2957	9542	3147	9578	3343	51
10	0.9383	1.2415	0.9425	1.2592	0.9466	1.2774	0.9505	1.2960	0.9543	1.3150	0.9579	1.3346	50
11	9383	2418	9426	2595	9467	2777	9506	2963	9543	3154	9579	3350	49
12	9384	2421	9427	2598	9467	2780	9506	2966	9544	3157	9580	3353	48
13	9385	2424	9427	2601	9468	2783	9507	2969	9545	3160	9580	3356	47
14	9385	2427	9428	2604	9469	2786	9508	2972	9545	3163	9581	3360	46
15	0.9386	1.2429	0.9429	1.2607	0.9469	1.2789	0.9508	1.2975	0.9546	1.3166	0.9582	1.3363	45
16	9387	2432	9429	2610	9470	2792	9509	2978	9546	3170	9582	3366	44
17	9388	2435	9430	2613	9471	2795	9510	2982	9547	3173	9583	3370	43
18	9388	2438	9431	2616	9471	2798	9510	2985	9548	3176	9583	3373	42
19	9389	2441	9431	2619	9472	2801	9511	2988	9548	3179	9584	3376	41
20	0.9390	1.2444	0.9432	1.2622	0.9473	1.2804	0.9512	1.2991	0.9549	1.3183	0.9584	1.3380	40
21	9391	2447	9433	2625	9473	2808	9512	2994	9549	3186	9585	3383	39
22	9391	2450	9433	2628	9474	2811	9513	2997	9550	3189	9586	3386	38
23	9392	2453	9434	2631	9475	2814	9513	3001	9551	3192	9586	3390	37
24	9393	2456	9435	2634	9475	2817	9514	3004	9551	3196	9587	3393	36
25	0.9393	1.2459	0.9436	1.2637	0.9476	1.2820	0.9515	1.3007	0.9552	1.3199	0.9587	1.3396	35
26	9394	2462	9436	2640	9477	2823	9515	3010	9552	3202	9588	3400	34
27	9395	2465	9437	2643	9477	2826	9516	3013	9553	3205	9588	3403	33
28	9396	2468	9438	2646	9478	2829	9517	3016	9554	3209	9589	3406	32
29	9396	2471	9438	2649	9479	2832	9517	3019	9554	3212	9590	3410	31
30	0.9397	1.2474	0.9439	1.2652	0.9479	1.2835	0.9518	1.3023	0.9555	1.3215	0.9590	1.3413	30
31	9398	2477	9440	2655	9480	2838	9519	3026	9555	3218	9591	3416	29
32	9398	2479	9440	2658	9481	2841	9519	3029	9556	3222	9591	3420	28
33	9399	2482	9441	2661	9481	2844	9520	3032	9557	3225	9592	3423	27
34	9400	2485	9442	2664	9482	2848	9520	3035	9557	3228	9593	3426	26
35	0.9401	1.2488	0.9442	1.2667	0.9483	1.2851	0.9521	1.3038	0.9558	1.3231	0.9593	1.3430	25
36	9401	2491	9443	2670	9483	2854	9522	3042	9558	3235	9594	3433	24
37	9402	2494	9444	2673	9484	2857	9522	3045	9559	3238	9594	3436	23
38	9403	2497	9444	2676	9485	2860	9523	3048	9560	3241	9595	3440	22
39	9403	2500	9445	2680	9485	2863	9524	3051	9560	3244	9595	3443	21
40	0.9404	1.2503	0.9446	1.2683	0.9486	1.2866	0.9524	1.3054	0.9561	1.3248	0.9596	1.3447	20
41	9405	2506	9447	2686	9486	2869	9525	3058	9561	3251	9597	3450	19
42	9406	2509	9447	2689	9487	2872	9525	3061	9562	3254	9597	3453	18
43	9406	2512	9448	2692	9488	2875	9526	3064	9563	3257	9598	3457	17
44	9407	2515	9448	2695	9488	2879	9527	3067	9563	3261	9598	3160	16
45	0.9408	1.2518	0.9449	1.2698	0.9489	1.2882	0.9527	1.3070	0.9564	1.3264	0.9599	1.3463	15
46	9408	2521	9450	2701	9490	2885	9528	3073	9564	3267	9599	3467	14
47	9409	2524	9451	2704	9490	2888	9529	3077	9565	3271	9600	3470	13
48	9410	2527	9451	2707	9491	2891	9529	3080	9566	3274	9601	3473	12
49	9110	2530	9452	2710	9492	2894	9530	3083	9566	3277	9601	3477	11
50	0.9411	1.2533	0.9453	1.2713	0.9492	1.2897	0.9530	1.3086	0.9567	1.3280	0.9602	1.3480	10
51	9412	2536	9453	2716	9493	2900	9531	3089	9567	3284	9602	3484	9
52	9413	2539	9454	2719	9494	2903	9532	3093	9568	3287	9603	3487	8
53	9413	2542	9455	2722	9494	2907	9532	3096	9569	3290	9603	3490	7
54	9414	2545	9455	2725	9495	2910	9533	3099	0569	3294	9604	3194	6
55	0.9415	1.2548	0.9456	1.2728	0.9496	1.2913	0.9534	1.3102	0.9570	1.3297	0.9604	1.3497	5
56	9415	2551	9457	2731	9496	2916	9534	3105	9570	3300	9605	3501	4
57	9416	2554	9457	2734	9497	2919	9535	3109	9571	3303	9606	3504	3
58	9417	2557	9458	2737	9498	2922	9535	3112	9572	3307	9606	3507	2
59	9417	2560	9459	2740	9498	2925	9536	3115	9572	3310	9607	3511	1
60	9418	2562	9459	2743	9499	2928	9537	3118	9573	3313	9607	3514	0
	Log. S.	Log. T.	Log S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T	Log. S.	Log. T.	M.
	119°		118°		117°		116°		115°		114°		

APPARENT DISTANCE.

Logarithms of the Apparent Distance.

M.	APPARENT DISTANCE. 66° Log. S.	66° Log. T.	67° Log. S.	67° Log. T.	68° Log. S.	68° Log. T.	69° Log. S.	69° Log. T.	70° Log. S.	70° Log. T.	71° Log. S.	71° Log. T.	
0	0.9607	1.3514	0.9640	1.3721	0.9672	1.3936	0.9702	1.4158	0.9730	1.4389	0.9757	1.4630	60
1	9608	3518	9641	3725	9672	3940	9702	4162	9730	4393	9757	4634	59
2	9608	3521	9641	3729	9673	3943	9702	4166	9731	4397	9758	4638	58
3	9609	3524	9642	3732	9673	3947	9703	4170	9731	4401	9758	4643	57
4	9610	3528	9642	3736	9674	3950	9703	4173	9732	4405	9758	4647	56
5	0.9610	1.3531	0.9643	1.3739	0.9674	1.3954	0.9704	1.4177	0.9732	1.4409	0.9759	1.4651	55
6	9611	3535	9643	3743	9675	3958	9704	4181	9733	4413	9759	4655	54
7	9611	3538	9644	3746	9675	3961	9705	4185	9733	4417	9760	4659	53
8	9612	3541	9645	3750	9676	3965	9705	4189	9734	4421	9760	4663	52
9	9612	3545	9645	3753	9676	3969	9706	4192	9734	4425	9761	4667	51
10	0.9613	1.3548	0.9646	1.3757	0.9677	1.3972	0.9706	1.4196	0.9734	1.4429	0.9761	1.4671	50
11	9613	3552	9646	3760	9677	3976	9707	4200	9735	4433	9761	4676	49
12	9614	3555	9647	3764	9678	3980	9707	4204	9735	4437	9762	4680	48
13	9615	3559	9647	3767	9678	3983	9708	4208	9736	4441	9762	4684	47
14	9615	3562	9648	3771	9679	3987	9708	4211	9736	4445	9763	4688	46
15	0.9616	1.3565	0.9648	1.3774	0.9679	1.3991	0.9709	1.4215	0.9737	1.4449	0.9763	1.4692	45
16	9616	3569	9649	3778	9680	3994	9709	4219	9737	4453	9764	4696	44
17	9617	3572	9649	3781	9680	3998	9710	4223	9738	4457	9764	4700	43
18	9617	3576	9650	3785	9681	4002	9710	4227	9738	4461	9764	4705	42
19	9618	3579	9650	3789	9681	4005	9711	4230	9739	4465	9765	4709	41
20	0.9618	1.3583	0.9651	1.3792	0.9682	1.4009	0.9711	1.4234	0.9739	1.4469	0.9765	1.4713	40
21	9619	3586	9651	3796	9682	4013	9712	4238	9739	4473	9766	4717	39
22	9620	3589	9652	3799	9683	4016	9712	4242	9740	4476	9766	4721	38
23	9620	3593	9652	3803	9683	4020	9713	4246	9740	4480	9767	4725	37
24	9621	3596	9653	3806	9684	4024	9713	4250	9741	4484	9767	4730	36
25	0.9621	1.3600	0.9654	1.3810	0.9684	1.4028	0.9714	1.4253	0.9741	1.4488	0.9767	1.4734	35
26	9622	3603	9654	3813	9685	4031	9714	4257	9742	4492	9768	4738	34
27	9622	3607	9655	3817	9685	4035	9714	4261	9742	4496	9768	4742	33
28	9623	3610	9655	3821	9686	4039	9715	4265	9743	4500	9769	4746	32
29	9623	3614	9656	3824	9686	4042	9715	4269	9743	4504	9769	4751	31
30	0.9624	1.3617	0.9656	1.3828	0.9687	1.4046	0.9716	1.4273	0.9743	1.4509	0.9770	1.4755	30
31	9625	3620	9657	3831	9687	4050	9716	4276	9744	4513	9770	4759	29
32	9625	3624	9657	3835	9688	4053	9717	4280	9744	4517	9770	4763	28
33	9626	3627	9658	3838	9688	4057	9717	4284	9745	4521	9771	4767	27
34	9626	3631	9658	3842	9689	4061	9718	4288	9745	4525	9771	4772	26
35	0.9627	1.3634	0.9659	1.3846	0.9689	1.4065	0.9718	1.4292	0.9746	1.4529	0.9772	1.4776	25
36	9627	3638	9659	3849	9690	4068	9719	4296	9746	4533	9772	4780	24
37	9628	3641	9660	3853	9690	4072	9719	4300	9747	4537	9773	4784	23
38	9628	3645	9660	3856	9691	4076	9720	4304	9747	4541	9773	4788	22
39	9629	3648	9661	3860	9691	4079	9720	4307	9747	4545	9773	4793	21
40	0.9629	1.3652	0.9661	1.3864	0.9692	1.4083	0.9721	1.4311	0.9748	1.4549	0.9774	1.4797	20
41	9630	3655	9662	3867	9692	4087	9721	4315	9748	4553	9774	4801	19
42	9631	3659	9662	3871	9693	4091	9722	4319	9749	4557	9775	4805	18
43	9631	3662	9663	3874	9693	4094	9722	4323	9749	4561	9775	4810	17
44	9632	3666	9663	3878	9694	4098	9722	4327	9750	4565	9775	4814	16
45	0.9632	1.3669	0.9664	1.3882	0.9694	1.4102	0.9723	1.4331	0.9750	1.4569	0.9776	1.4818	15
46	9633	3673	9664	3885	9695	4106	9723	4335	9751	4573	9776	4822	14
47	9633	3676	9665	3889	9695	4109	9724	4338	9751	4577	9777	4827	13
48	9634	3679	9665	3892	9696	4113	9724	4342	9751	4581	9777	4831	12
49	9634	3683	9666	3896	9696	4117	9725	4346	9752	4585	9778	4835	11
50	0.9635	1.3686	0.9667	1.3900	0.9697	1.4121	0.9725	1.4350	0.9752	1.4589	0.9778	1.4839	10
51	9635	3690	9667	3903	9697	4124	9726	4354	9753	4593	9778	4844	9
52	9636	3693	9668	3907	9698	4128	9726	4358	9753	4598	9779	4848	8
53	9636	3697	9668	3910	9698	4132	9727	4362	9754	4602	9779	4852	7
54	9637	3700	9669	3914	9699	4136	9727	4366	9754	4606	9780	4857	6
55	0.9638	1.3704	0.9669	1.3918	0.9699	1.4139	0.9728	1.4370	0.9755	1.4610	0.9780	1.4861	5
56	9638	3707	9670	3921	9700	4143	9728	4374	9755	4614	9780	4865	4
57	9639	3711	9670	3925	9700	4147	9728	4378	9755	4618	9781	4869	3
58	9639	3714	9671	3929	9701	4151	9729	4381	9756	4622	9781	4874	2
59	9640	3718	9671	3932	9701	4154	9729	4385	9756	4626	9782	4878	1
60	9640	3721	9672	3936	9702	4158	9730	4389	9757	4630	9782	4882	0
	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	M.
	113°		112°		111°		110°		109°		108°		
	APPARENT DISTANCE.												

TABLE XVI.

Logarithms of the Apparent Distance.

M.	APPARENT DISTANCE. 72° Log. S.	72° Log. T.	73° Log. S.	73° Log. T.	74° Log. S.	74° Log. T.	75° Log. S.	75° Log. T.	76° Log. S.	76° Log. T.	77° Log. S.	77° Log. T.	
0	0.9782	1.4882	0.9806	1.5147	0.9828	1.5425	0.9849	1.5719	0.9869	1.6032	0.9887	1.6366	60
1	9782	4887	9806	5151	9829	5430	9850	5725	9869	6038	9888	6372	59
2	9783	4891	9807	5156	9829	5435	9850	5730	9870	6043	9888	6378	58
3	9783	4895	9807	5160	9829	5439	9850	5735	9870	6048	9888	6384	57
4	9784	4899	9807	5165	9830	5444	9851	5740	9870	6054	9888	6389	56
5	0.9784	1.4904	0.9808	1.5169	0.9830	1.5449	0.9851	1.5745	0.9871	1.6059	0.9889	1.6395	55
6	9785	4908	9808	5174	9831	5454	9851	5750	9871	6065	9889	6401	54
7	9785	4912	9809	5178	9831	5459	9852	5755	9871	6070	9889	6407	53
8	9785	4917	9809	5183	9831	5463	9852	5760	9872	6076	9890	6413	52
9	9786	4921	9809	5187	9832	5468	9852	5765	9872	6081	9890	6419	51
10	0.9786	1.4925	0.9810	1.5192	0.9832	1.5473	0.9853	1.5770	0.9872	1.6086	0.9890	1.6424	50
11	9787	4930	9810	5197	9832	5478	9853	5775	9872	6092	9890	6430	49
12	9787	4934	9811	5201	9833	5483	9853	5780	9873	6097	9891	6436	48
13	9787	4938	9811	5206	9833	5487	9854	5786	9873	6103	9891	6442	47
14	9788	4943	9811	5210	9833	5492	9854	5791	9873	6108	9891	6448	46
15	0.9788	1.4947	0.9812	1.5215	0.9834	1.5497	0.9854	1.5796	0.9874	1.6114	0.9892	1.6454	45
16	9789	4951	9812	5219	9834	5502	9855	5801	9874	6119	9892	6459	44
17	9789	4956	9812	5224	9835	5507	9855	5806	9874	6125	9892	6465	43
18	9789	4960	9813	5229	9835	5512	9855	5811	9875	6130	9892	6471	42
19	9790	4965	9813	5233	9835	5516	9856	5816	9875	6136	9893	6477	41
20	0.9790	1.4969	0.9814	1.5238	0.9836	1.5521	0.9856	1.5822	0.9875	1.6141	0.9893	1.6483	40
21	9791	4973	9814	5242	9836	5526	9856	5827	9876	6147	9893	6489	39
22	9791	4978	9814	5247	9836	5531	9857	5832	9876	6152	9894	6495	38
23	9791	4982	9815	5252	9837	5536	9857	5837	9876	6158	9894	6501	37
24	9792	4986	9815	5256	9837	5541	9857	5842	9876	6163	9894	6507	36
25	0.9792	1.4991	0.9815	1.5261	0.9837	1.5546	0.9858	1.5847	0.9877	1.6169	0.9894	1.6513	35
26	9793	4995	9816	5265	9838	5551	9858	5853	9877	6174	9895	6519	34
27	9793	5000	9816	5270	9838	5555	9858	5858	9877	6180	9895	6525	33
28	9793	5004	9817	5275	9838	5560	9859	5863	9878	6185	9895	6531	32
29	9794	5008	9817	5279	9839	5565	9859	5868	9878	6191	9896	6536	31
30	0.9794	1.5013	0.9817	1.5284	0.9839	1.5570	0.9859	1.5873	0.9878	1.6196	0.9896	1.6542	30
31	9795	5017	9818	5289	9839	5575	9860	5879	9879	6202	9896	6548	29
32	9795	5022	9818	5293	9840	5580	9860	5884	9879	6208	9896	6554	28
33	9795	5026	9818	5298	9840	5585	9860	5889	9879	6213	9897	6560	27
34	9796	5030	9819	5303	9840	5590	9861	5894	9880	6219	9897	6566	26
35	0.9796	1.5035	0.9819	1.5307	0.9841	1.5595	0.9861	1.5900	0.9880	1.6224	0.9897	1.6572	25
36	9797	5039	9820	5312	9841	5600	9861	5905	9880	6230	9897	6578	24
37	9797	5044	9820	5317	9842	5605	9862	5910	9880	6236	9898	6584	23
38	9797	5048	9820	5321	9842	5610	9862	5915	9881	6241	9898	6591	22
39	9798	5053	9821	5326	9842	5614	9862	5921	9881	6247	9898	6597	21
40	0.9798	1.5057	0.9821	1.5331	0.9843	1.5619	0.9863	1.5926	0.9881	1.6252	0.9899	1.6603	20
41	9799	5061	9821	5335	9843	5624	9863	5931	9882	6258	9899	6609	19
42	9799	5066	9822	5340	9843	5629	9863	5936	9882	6264	9899	6615	18
43	9799	5070	9822	5345	9844	5634	9864	5942	9882	6269	9899	6621	17
44	9800	5075	9823	5350	9844	5639	9864	5947	9883	6275	9900	6627	16
45	0.9800	1.5079	0.9823	1.5354	0.9844	1.5644	0.9864	1.5952	0.9883	1.6281	0.9900	1.6633	15
46	9801	5084	9823	5359	9845	5649	9865	5958	9883	6286	9900	6639	14
47	9801	5088	9824	5363	9845	5654	9865	5963	9883	6292	9901	6645	13
48	9801	5092	9824	5368	9845	5659	9865	5968	9884	6298	9901	6651	12
49	9802	5097	9824	5373	9846	5664	9866	5973	9884	6303	9901	6657	11
50	0.9802	1.5102	0.9825	1.5378	0.9846	1.5669	0.9866	1.5979	0.9884	1.6309	0.9901	1.6664	10
51	9802	5106	9825	5382	9846	5674	9866	5984	9885	6315	9902	6670	9
52	9803	5111	9826	5387	9847	5679	9867	5989	9885	6320	9902	6676	8
53	9803	5115	9826	5392	9847	5684	9867	5995	9885	6326	9902	6682	7
54	9804	5120	9826	5397	9847	5689	9867	6000	9885	6332	9902	6688	6
55	0.9804	1.5124	0.9827	1.5401	0.9848	1.5694	0.9868	1.6005	0.9886	1.6338	0.9903	1.6694	5
56	9804	5129	9827	5406	9848	5699	9868	6011	9886	6343	9903	6700	4
57	9805	5133	9827	5411	9848	5704	9868	6016	9886	6349	9903	6707	3
58	9805	5138	9828	5416	9849	5709	9868	6022	9887	6355	9904	6713	2
59	9806	5142	9828	5420	9849	5714	9869	6027	9887	6361	9904	6719	1
60	9806	5147	9828	5425	9849	5719	9869	6032	9887	6366	9904	6725	0
	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	M.
	107°		106°		105°		104°		103°		102°		
	APPARENT DISTANCE.												

TABLE XVI.

Logarithms of the Apparent Distance

M.	APPARENT DISTANCE. 78° Log. S.	78° Log. T.	79° Log. S.	79° Log. T.	80° Log. S.	80° Log. T.	81° Log. S.	81° Log. T.	82° Log. S	82° Log. T.	83° Log. S.	83° Log. T.	
0	0.9904	1.6725	0.9919	1.7113	0.9934	1.7537	0.9946	1.8003	0.9958	1.8522	0.9968	1.9109	60
1	9904	6731	9920	7120	9934	7544	9946	8011	9958	8531	9968	9119	59
2	9905	6738	9920	7127	9934	7552	9947	8019	9958	8540	9968	9129	58
3	9905	6744	9920	7134	9934	7559	9947	8027	9958	8550	9968	9140	57
4	9905	6750	9920	7141	9934	7566	9947	8036	9958	8559	9968	9151	56
5	0.9905	1.6756	0.9921	1.7147	0.9935	1.7574	0.9947	1.8044	0.9958	1.8568	0.9968	1.9161	55
6	9906	6763	9921	7154	9935	7581	9947	8052	9959	8577	9968	9172	54
7	9906	6769	9921	7161	9935	7589	9948	8060	9959	8587	9969	9182	53
8	9906	6775	9921	7168	9935	7596	9948	8069	9959	8596	9969	9193	52
9	9906	6781	9922	7175	9936	7604	9948	8077	9959	8605	9969	9204	51
10	0.9907	1.6788	0.9922	1.7181	0.9936	1.7611	0.9948	1.8085	0.9959	1.8615	0.9969	1.9214	50
11	9907	6794	9922	7188	9936	7619	9948	8094	9959	8624	9969	9225	49
12	9907	6800	9922	7195	9936	7626	9949	8102	9960	8633	9969	9236	48
13	9907	6807	9923	7202	9936	7634	9949	8110	9960	8643	9969	9246	47
14	9908	6813	9923	7209	9937	7641	9949	8119	9960	8652	9970	9257	46
15	0.9908	1.6819	0.9923	1.7216	0.9937	1.7649	0.9949	1.8127	0.9960	1.8662	0.9970	1.9268	45
16	9908	6826	9923	7223	9937	7657	9949	8136	9960	8671	9970	9279	44
17	9908	6832	9924	7230	9937	7664	9950	8144	9960	8681	9970	9290	43
18	9909	6838	9924	7236	9937	7672	9950	8152	9961	8690	9970	9301	42
19	9909	6845	9924	7243	9938	7679	9950	8161	9961	8700	9970	9312	41
20	0.9909	1.6851	0.9924	1.7250	0.9938	1.7687	0.9950	1.8170	0.9961	1.8709	0.9971	1.9323	40
21	9910	6858	9925	7257	9938	7695	9950	8178	9961	8719	9971	9333	39
22	9910	6864	9925	7264	9938	7702	9951	8186	9961	8728	9971	9344	38
23	9910	6870	9925	7271	9939	7710	9951	8195	9962	8738	9971	9355	37
24	9910	6877	9925	7278	9939	7718	9951	8203	9962	8748	9971	9367	36
25	0.9911	1.6883	0.9926	1.7285	0.9939	1.7725	0.9951	1.8212	0.9962	1.8757	0.9971	1.9378	35
26	9911	6890	9926	7292	9939	7733	9951	8221	9962	8767	9971	9389	34
27	9911	6896	9926	7299	9939	7741	9951	8229	9962	8777	9972	9400	33
28	9911	6902	9926	7306	9940	7748	9952	8238	9962	8786	9972	9411	32
29	9912	6909	9926	7313	9940	7756	9952	8246	9963	8796	9972	9422	31
30	0.9912	1.6915	0.9927	1.7320	0.9940	1.7764	0.9952	1.8255	0.9963	1.8806	0.9972	1.9433	30
31	9912	6922	9927	7327	9940	7772	9952	8264	9963	8815	9972	9445	29
32	9912	6928	9927	7334	9940	7779	9952	8272	9963	8825	9972	9456	28
33	9913	6935	9927	7342	9941	7787	9953	8281	9963	8835	9972	9467	27
34	9913	6941	9928	7349	9941	7795	9953	8290	9963	8845	9973	9479	26
35	0.9913	1.6948	0.9928	1.7356	0.9941	1.7803	0.9953	1.8298	0.9964	1.8855	0.9973	1.9490	25
36	9913	6954	9928	7363	9941	7811	9953	8307	9964	8865	9973	9501	24
37	9914	6961	9928	7370	9942	7819	9953	8316	9964	8875	9973	9513	23
38	9914	6967	9929	7377	9942	7826	9954	8325	9964	8884	9973	9524	22
39	9914	6974	9929	7384	9942	7834	9954	8333	9964	8894	9973	9536	21
40	0.9914	1.6980	0.9929	1.7391	0.9942	1.7842	0.9954	1.8342	0.9964	1.8904	0.9973	1.9547	20
41	9915	6987	9929	7399	9942	7850	9954	8351	9964	8914	9974	9559	19
42	9915	6994	9929	7406	9943	7858	9954	8360	9965	8924	9974	9570	18
43	9915	7000	9930	7413	9943	7866	9954	8369	9965	8934	9974	9582	17
44	9915	7007	9930	7420	9943	7874	9955	8378	9965	8944	9974	9593	16
45	0.9916	1.7013	0.9930	1.7427	0.9943	1.7882	0.9955	1.8387	0.9965	1.8955	0.9974	1.9605	15
46	9916	7020	9930	7435	9943	7890	9955	8395	9965	8965	9974	9617	14
47	9916	7027	9931	7442	9944	7898	9955	8404	9965	8975	9974	9629	13
48	9916	7033	9931	7449	9944	7906	9955	8413	9966	8985	9975	9640	12
49	9917	7040	9931	7456	9944	7914	9956	8422	9966	8995	9975	9652	11
50	0.9917	1.7047	0.9931	1.7464	0.9944	1.7922	0.9956	1.8431	0.9966	1.9005	0.9975	1.9664	10
51	9917	7053	9931	7471	9944	7930	9956	8440	9966	9016	9975	9676	9
52	9917	7060	9932	7478	9945	7938	9956	8449	9966	9026	9975	9688	8
53	9918	7066	9932	7485	9945	7946	9956	8458	9966	9036	9975	9700	7
54	9918	7073	9932	7493	9945	7954	9956	8467	9967	9046	9975	9711	6
55	0.9918	1.7080	0.9932	1.7500	0.9945	1.7962	0.9957	1.8476	0.9967	1.9057	0.9975	1.9723	5
56	9918	7087	9933	7507	9945	7970	9957	8485	9967	9067	9976	9735	4
57	9919	7093	9933	7515	9946	7978	9957	8495	9967	9077	9976	9747	3
58	9919	7100	9933	7522	9946	7987	9957	8504	9967	9088	9976	9760	2
59	9919	7107	9933	7529	9946	7995	9957	8513	9967	9098	9976	9772	1
60	9919	7113	9934	7537	9946	8003	9958	8522	9968	9109	9976	9784	0
	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T	Log. S.	Log. T.	M.
	101°		100°		99°		98°		97°		96°		
	APPARENT DISTANCE												

TABLE XVI.

Logarithms of the Apparent Distance.

M.	APPARENT DISTANCE. 84° Log. S.	84° Log. T.	85° Log. S.	85° Log. T.	86° Log. S.	86° Log. T.	87° Log. S.	87° Log. T.	88° Log. S.	88° Log. T.	89° Log. S.	89° Log. T.	M.
0	0.9976	1.9784	0.9983	2.0580	0.9989	2.1554	0.9994	2.2806	0.9997	2.4559	0.9999	2.7581	60
1	9976	9796	9984	0595	9989	1572	9994	2830	9997	4606	9999	7654	59
2	9976	9808	9984	0610	9990	1590	9994	2855	9997	4642	9999	7728	58
3	9977	9820	9984	0624	9990	1608	9994	2879	9997	4679	9999	7804	57
4	9977	9833	9984	0639	9990	1627	9994	2904	9998	4717	9999	7880	56
5	0.9977	1.9845	0.9984	2.0654	0.9990	2.1645	0.9994	2.2929	0.9998	2.4754	0.9999	2.7959	55
6	9977	9857	9984	0669	9990	1664	9994	2954	9998	4792	9999	8038	54
7	9977	9870	9984	0684	9990	1683	9995	2979	9998	4830	9999	8120	53
8	9977	9882	9984	0698	9990	1701	9995	3004	9998	4869	9999	8202	52
9	9977	9895	9984	0713	9990	1720	9995	3029	9998	4908	1.0000	8287	51
10	0.9977	1.9907	0.9985	2.0728	0.9990	2.1739	0.9995	2.3055	0.9998	2.4947	1.0000	2.8373	50
11	9978	9920	9985	0744	9990	1758	9995	3081	9998	4987	0000	8460	49
12	9978	9932	9985	0759	9990	1777	9995	3106	9998	5027	0000	8550	48
13	9978	9945	9985	0774	9991	1796	9995	3132	9998	5067	0000	8641	47
14	9978	9957	9985	0789	9991	1815	9995	3158	9998	5108	0000	8735	46
15	0.9978	1.9970	0.9985	2.0804	0.9991	2.1835	0.9995	2.3185	0.9998	2.5149	1.0000	2.8830	45
16	9978	9983	9985	0820	9991	1854	9995	3211	9998	5191	0000	8928	44
17	9978	9995	9985	0835	9991	1874	9995	3238	9998	5233	0000	9028	43
18	9978	2.0008	9985	0850	9991	1893	9995	3264	9998	5275	0000	9130	42
19	9979	0021	9985	0866	9991	1913	9995	3291	9998	5318	0000	9235	41
20	0.9979	2.0034	0.9986	2.0882	0.9991	2.1933	0.9995	2.3318	0.9998	2.5362	1.0000	2.9342	40
21	9979	0047	9986	0897	9991	1952	9995	3346	9998	5405	0000	9452	39
22	9979	0060	9986	0913	9991	1972	9995	3373	9998	5449	0000	9565	38
23	9979	0073	9986	0929	9991	1992	9995	3401	9998	5494	0000	9681	37
24	9979	0086	9986	0944	9991	2012	9996	3429	9998	5539	0000	9799	36
25	0.9979	2.0099	0.9986	2.0960	0.9991	2.2033	0.9996	2.3456	0.9998	2.5584	1.0000	2.9922	35
26	9979	0112	9986	0976	9992	2053	9996	3485	9998	5630	0000	3.0048	34
27	9980	0125	9986	0992	9992	2073	9996	3513	9998	5677	0000	0177	33
28	9980	0138	9986	1008	9992	2094	9996	3541	9998	5724	0000	0311	32
29	9980	0151	9986	1024	9992	2114	9996	3570	9998	5771	0000	0449	31
30	0.9980	2.0164	0.9987	2.1040	0.9992	2.2135	0.9996	2.3599	0.9999	2.5819	1.0000	3.0591	30
31	9980	0178	9987	1056	9992	2156	9996	3628	9999	5868	0000	0739	29
32	9980	0191	9987	1073	9992	2177	9996	3657	9999	5917	0000	0891	28
33	9980	0204	9987	1089	9992	2198	9996	3687	9999	5967	0000	1049	27
34	9980	0218	9987	1105	9992	2219	9996	3717	9999	6017	0000	1213	26
35	0.9981	2.0231	0.9987	2.1122	0.9992	2.2240	0.9996	2.3746	0.9999	2.6068	1.0000	3.1383	25
36	9981	0244	9987	1138	9992	2261	9996	3777	9999	6119	0000	1561	24
37	9981	0258	9987	1155	9992	2283	9996	3807	9999	6171	0000	1745	23
38	9981	0271	9987	1171	9992	2304	9996	3837	9999	6224	0000	1938	22
39	9981	0285	9987	1188	9993	2326	9996	3868	9999	6277	0000	2140	21
40	0.9981	2.0299	0.9988	2.1205	0.9993	2.2348	0.9996	2.3899	0.9999	2.6331	1.0000	3.2352	20
41	9981	0312	9988	1222	9993	2369	9996	3930	9999	6386	0000	2575	19
42	9981	0326	9988	1238	9993	2391	9996	3962	9999	6441	0000	2810	18
43	9982	0340	9988	1255	9993	2413	9997	3993	9999	6497	0000	3058	17
44	9982	0354	9988	1272	9993	2435	9997	4025	9999	6554	0000	3322	16
45	0.9982	2.0367	0.9988	2.1289	0.9993	2.2458	0.9997	2.4057	0.9999	2.6611	1.0000	3.3602	15
46	9982	0381	9988	1306	9993	2480	9997	4089	9999	6670	0000	3901	14
47	9982	0395	9988	1324	9993	2502	9997	4122	9999	6729	0000	4223	13
48	9982	0409	9988	1341	9993	2525	9997	4155	9999	6789	0000	4571	12
49	9982	0423	9988	1358	9993	2548	9997	4188	9999	6850	0000	4949	11
50	0.9982	2.0437	0.9989	2.1376	0.9993	2.2571	0.9997	2.4221	0.9999	2.6911	1.0000	3.5363	10
51	9982	0451	9989	1393	9993	2594	9997	4255	9999	6974	0000	5820	9
52	9983	0466	9989	1411	9993	2617	9997	4289	9999	7037	0000	6332	8
53	9983	0480	9989	1428	9994	2640	9997	4323	9999	7101	0000	6912	7
54	9983	0494	9989	1446	9994	2663	9997	4357	9999	7167	0000	7581	6
55	0.9983	2.0508	0.9989	2.1464	0.9994	2.2687	0.9997	2.4392	0.9999	2.7233	1.0000	3.8373	5
56	9983	0523	9989	1482	9994	2710	9997	4427	9999	7300	0000	9342	4
57	9983	0537	9989	1499	9994	2734	9997	4462	9999	7369	0000	4.0592	3
58	9983	0552	9989	1517	9994	2758	9997	4497	9999	7438	0000	2352	2
59	9983	0566	9989	1535	9994	2782	9997	4533	9999	7509	0000	5363	1
60	9983	0580	9989	1554	9994	2806	9997	4569	9999	7581	0000		0
	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	Log. S.	Log. T.	M.
	95°		94°		93°		92°		91°		90°		

APPARENT DISTANCE.

TABLE XVII.

Logarithms of the First and Second Corrections.

The First Correction is *always* to be taken from the Top, and also the Second, when the Apparent Distance is *greater* than 90°.

2 DEGREES.

S.	0′	1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	
0	1.0000	1.0024	1.0049	1.0073	1.0098	1.0122	1.0147	1.0172	1.0197	1.0223	1.0248	1.0274	60
1	0000	0025	0049	0073	0098	0123	0148	0173	0198	0223	0249	0274	59
2	0001	0025	0049	0074	0098	0123	0148	0173	0198	0224	0249	0275	58
3	0001	0025	0050	0074	0099	0124	0148	0174	0199	0224	0250	0275	57
4	0002	0026	0050	0075	0099	0124	0149	0174	0199	0224	0250	0276	56
5	1.0002	1.0026	1.0051	1.0075	1.0100	1.0124	1.0149	1.0174	1.0200	1.0225	1.0250	1.0276	55
6	0002	0027	0051	0075	0100	0125	0150	0175	0200	0225	0251	0276	54
7	0003	0027	0051	0076	0100	0125	0150	0175	0200	0226	0251	0277	53
8	0003	0027	0052	0076	0101	0126	0151	0176	0201	0226	0252	0277	52
9	0004	0028	0052	0077	0101	0126	0151	0176	0201	0227	0252	0278	51
10	1.0004	1.0028	1.0053	1.0077	1.0102	1.0126	1.0151	1.0176	1.0202	1.0227	1.0252	1.0278	50
11	0004	0029	0053	0077	0102	0127	0152	0177	0202	0227	0253	0279	49
12	0005	0029	0053	0078	0103	0127	0152	0177	0202	0228	0253	0279	48
13	0005	0029	0054	0078	0103	0128	0153	0178	0203	0228	0253	0279	47
14	0006	0030	0054	0079	0103	0128	0153	0178	0203	0229	0254	0280	46
15	1.0006	1.0030	1.0055	1.0079	1.0104	1.0129	1.0153	1.0179	1.0204	1.0229	1.0255	1.0280	45
16	0006	0031	0055	0080	0104	0129	0154	0179	0204	0230	0255	0281	44
17	0007	0031	0055	0080	0105	0129	0154	0179	0205	0230	0255	0281	43
18	0007	0031	0056	0080	0105	0130	0155	0180	0205	0230	0256	0282	42
19	0008	0032	0056	0081	0105	0130	0155	0180	0205	0231	0256	0282	41
20	1.0008	1.0032	1.0057	1.0081	1.0106	1.0131	1.0156	1.0181	1.0206	1.0231	1.0257	1.0282	40
21	0008	0033	0057	0082	0106	0131	0156	0181	0207	0232	0257	0283	39
22	0009	0033	0057	0082	0107	0131	0156	0181	0207	0232	0258	0283	38
23	0009	0034	0058	0082	0107	0132	0157	0182	0207	0233	0258	0284	37
24	0010	0034	0058	0083	0107	0132	0157	0182	0208	0233	0258	0284	36
25	1.0010	1.0034	1.0059	1.0083	1.0108	1.0133	1.0158	1.0183	1.0208	1.0233	1.0259	1.0285	35
26	0010	0035	0059	0084	0108	0133	0158	0183	0208	0234	0259	0285	34
27	0011	0035	0060	0084	0109	0134	0158	0184	0209	0234	0259	0285	33
28	0011	0036	0060	0084	0109	0134	0159	0184	0209	0235	0260	0286	32
29	0012	0036	0060	0085	0110	0134	0159	0184	0210	0235	0260	0286	31
30	1.0012	1.0036	1.0061	1.0085	1.0110	1.0135	1.0160	1.0185	1.0210	1.0235	1.0261	1.0287	30
31	0012	0037	0061	0086	0110	0135	0160	0185	0211	0236	0261	0287	29
32	0013	0037	0062	0086	0111	0136	0161	0186	0211	0236	0261	0288	28
33	0013	0038	0062	0087	0111	0136	0161	0186	0211	0237	0262	0288	27
34	0014	0038	0062	0087	0112	0136	0161	0187	0212	0237	0262	0288	26
35	1.0014	1.0038	1.0063	1.0087	1.0112	1.0137	1.0162	1.0187	1.0212	1.0238	1.0263	1.0289	25
36	0015	0039	0063	0088	0112	0137	0162	0187	0213	0238	0263	0289	24
37	0014	0039	0064	0088	0113	0138	0163	0188	0213	0238	0264	0290	23
38	0015	0040	0064	0089	0113	0138	0163	0188	0213	0239	0264	0290	22
39	0016	0040	0064	0089	0114	0139	0163	0189	0214	0239	0264	0291	21
40	1.0016	1.0040	1.0065	1.0089	1.0114	1.0139	1.0164	1.0189	1.0214	1.0240	1.0265	1.0291	20
41	0017	0041	0065	0090	0114	0139	0164	0189	0215	0240	0266	0291	19
42	0017	0041	0066	0090	0115	0140	0165	0190	0215	0241	0266	0292	18
43	0017	0042	0066	0091	0115	0140	0165	0190	0216	0241	0267	0292	17
44	0018	0042	0066	0091	0116	0141	0166	0191	0216	0241	0267	0293	16
45	1.0018	1.0042	1.0067	1.0091	1.0116	1.0141	1.0166	1.0191	1.0216	1.0242	1.0267	1.0293	15
46	0019	0043	0067	0092	0117	0141	0166	0192	0217	0242	0268	0294	14
47	0019	0043	0068	0092	0117	0142	0167	0192	0217	0243	0268	0294	13
48	0019	0044	0068	0093	0117	0142	0167	0192	0218	0243	0269	0294	12
49	0020	0044	0068	0093	0118	0143	0168	0193	0218	0244	0269	0295	11
50	1.0020	1.0044	1.0069	1.0093	1.0118	1.0143	1.0168	1.0193	1.0219	1.0244	1.0270	1.0295	10
51	0021	0045	0069	0094	0119	0143	0169	0194	0219	0244	0270	0296	9
52	0021	0045	0070	0094	0119	0144	0169	0194	0219	0245	0270	0296	8
53	0021	0046	0070	0095	0119	0144	0169	0194	0220	0245	0271	0297	7
54	0022	0046	0071	0095	0120	0145	0170	0195	0220	0246	0271	0297	6
55	1.0022	1.0046	1.0071	1.0096	1.0120	1.0145	1.0170	1.0195	1.0221	1.0246	1.0272	1 0297	5
56	0023	0047	0071	0096	0121	0146	0171	0196	0221	0247	0272	0298	4
57	0023	0047	0072	0096	0121	0146	0171	0196	0221	0247	0273	0298	3
58	0023	0048	0072	0097	0122	0146	0171	0197	0222	0247	0273	0299	2
59	0024	0048	0073	0097	0122	0147	0172	0197	0222	0248	0273	0299	1
60	0024	0049	0073	0098	0122	0147	0172	0197	0223	0248	0274	0300	0
	59′	58′	57′	56′	55′	54′	53′	52′	51′	50′	49′	48′	S.

7 DEGREES.

When the Apparent Distance is *less* than 90°, the Second Correction is to be taken from the Bottom.

TABLE XVII

Logarithms of the First and Second Corrections.

The First Correction is *always* to be taken from the Top, and also the Second, when the Apparent Distance is *greater* than 90°.

2 DEGREES.

S.	12′	13′	14′	15′	16′	17′	18′	19′	20′	21′	22′	23′	
0	1.0300	1.0326	1.0352	1.0378	1.0405	1.0431	1.0458	1.0484	1.0512	1.0539	1.0566	1.0594	60
1	0300	0326	0352	0378	0405	0432	0458	0485	0512	0539	0567	0594	59
2	0300	0326	0353	0379	0406	0432	0459	0485	0512	0540	0567	0595	58
3	0301	0327	0353	0379	0406	0433	0459	0486	0513	0540	0568	0595	57
4	0301	0327	0353	0380	0406	0433	0460	0486	0513	0541	0568	0596	56
5	1.0302	1.0328	1.0354	1.0380	1.0407	1.0434	1.0460	1.0487	1.0514	1.0541	1.0568	1.0596	55
6	0302	0328	0354	0381	0407	0434	0461	0487	0514	0541	0569	0596	54
7	0303	0329	0355	0381	0408	0434	0461	0488	0515	0542	0569	0597	53
8	0303	0329	0355	0381	0408	0435	0462	0488	0515	0542	0570	0597	52
9	0304	0329	0356	0382	0409	0435	0462	0489	0516	0543	0570	0598	51
10	1.0304	1.0330	1.0356	1.0382	1.0409	1.0436	1.0462	1.0489	1.0516	1.0543	1.0571	1.0598	50
11	0304	0330	0356	0383	0409	0436	0463	0489	0517	0544	0571	0599	49
12	0305	0331	0357	0383	0410	0437	0463	0490	0517	0544	0572	0599	48
13	0305	0331	0358	0384	0410	0437	0464	0490	0517	0545	0572	0600	47
14	0306	0332	0358	0384	0410	0438	0464	0491	0518	0545	0573	0600	46
15	1.0306	1.0332	1.0359	1.0384	1.0411	1.0438	1.0465	1.0491	1.0518	1.0546	1.0573	1.0601	45
16	0307	0333	0359	0385	0411	0438	0465	0492	0519	0546	0573	0601	44
17	0307	0333	0360	0385	0412	0439	0466	0492	0519	0546	0574	0602	43
18	0307	0333	0360	0386	0412	0439	0466	0493	0520	0547	0574	0602	42
19	0308	0334	0361	0386	0413	0440	0466	0493	0520	0547	0575	0602	41
20	1.0308	1.0334	1.0361	1.0387	1.0413	1.0440	1.0467	1.0493	1.0521	1.0548	1.0575	1.0603	40
21	0309	0335	0361	0387	0414	0440	0467	0494	0521	0548	0576	0603	39
22	0309	0335	0362	0388	0414	0441	0468	0494	0521	0549	0576	0604	38
23	0310	0336	0362	0388	0414	0441	0468	0495	0522	0549	0577	0604	37
24	0310	0336	0362	0388	0415	0442	0469	0495	0522	0550	0577	0605	36
25	1.0310	1.0336	1.0363	1.0389	1.0415	1.0442	1.0469	1.0496	1.0523	1.0550	1.0578	1.0605	35
26	0311	0337	0363	0389	0416	0442	0470	0496	0523	0551	0578	0606	34
27	0311	0337	0363	0390	0416	0443	0470	0497	0524	0551	0579	0606	33
28	0312	0338	0364	0390	0417	0443	0470	0497	0524	0552	0579	0607	32
29	0312	0338	0364	0391	0417	0444	0471	0498	0525	0552	0579	0607	31
30	1.0313	1.0339	1.0365	1.0391	1.0418	1.0444	1.0471	1.0498	1.0525	1.0552	1.0580	1.0608	30
31	0313	0339	0365	0392	0418	0445	0471	0498	0526	0553	0580	0608	29
32	0313	0339	0366	0392	0418	0445	0472	0499	0526	0553	0581	0609	28
33	0314	0340	0366	0392	0419	0446	0472	0499	0526	0554	0581	0609	27
34	0314	0340	0366	0393	0419	0446	0472	0500	0527	0554	0582	0609	26
35	1.0315	1.0341	1.0367	1.0393	1.0420	1.0446	1.0473	1.0500	1.0527	1.0555	1.0582	1.0610	25
36	0315	0341	0367	0394	0420	0447	0474	0501	0528	0555	0583	0610	24
37	0316	0342	0368	0394	0421	0447	0474	0501	0528	0556	0583	0611	23
38	0316	0342	0368	0395	0421	0448	0475	0502	0529	0556	0584	0611	22
39	0317	0342	0369	0395	0422	0448	0475	0502	0529	0557	0584	0612	21
40	1.0317	1.0343	1.0369	1.0395	1.0422	1.0449	1.0475	1.0502	1.0530	1.0557	1.0585	1.0612	20
41	0318	0343	0370	0396	0422	0449	0476	0503	0531	0557	0585	0613	19
42	0318	0344	0370	0396	0423	0450	0476	0503	0531	0558	0585	0613	18
43	0318	0344	0370	0397	0423	0450	0477	0504	0531	0558	0586	0614	17
44	0319	0345	0371	0397	0424	0450	0477	0504	0532	0559	0586	0614	16
45	1.0319	1.0345	1.0371	1.0398	1.0424	1.0451	1.0478	1.0505	1.0532	1.0559	1.0587	1.0615	15
46	0319	0346	0372	0398	0425	0451	0478	0505	0532	0560	0587	0615	14
47	0320	0346	0372	0399	0425	0452	0479	0506	0533	0560	0588	0615	13
48	0320	0346	0373	0399	0426	0452	0479	0506	0533	0561	0588	0616	12
49	0321	0347	0373	0399	0426	0453	0480	0507	0534	0561	0589	0616	11
50	1.0321	1.0347	1.0374	1.0400	1.0426	1.0453	1.0480	1.0507	1.0534	1.0562	1.0589	1.0617	10
51	0322	0348	0374	0400	0427	0454	0480	0507	0535	0562	0590	0617	9
52	0322	0348	0374	0401	0427	0454	0481	0508	0535	0562	0590	0618	8
53	0323	0349	0375	0401	0428	0454	0481	0508	0536	0563	0591	0618	7
54	0323	0349	0375	0402	0428	0455	0482	0509	0536	0563	0591	0619	6
55	1.0323	1.0349	1.0376	1.0402	1.0429	1.0455	1.0482	1.0509	1.0536	1.0564	1.0591	1.0619	5
56	0324	0350	0376	0403	0429	0456	0483	0510	0537	0564	0592	0620	4
57	0324	0350	0377	0403	0430	0456	0483	0510	0537	0565	0592	0620	3
58	0325	0351	0377	0403	0430	0457	0484	0511	0538	0565	0593	0621	2
59	0325	0351	0377	0404	0430	0457	0484	0511	0538	0566	0593	0621	1
60	0326	0352	0378	0404	0431	0458	0484	0512	0539	0566	0594	0621	0
	47′	46′	45′	44′	43′	42′	41′	40′	39′	38′	37′	36′	S.

7 DEGREES.

When the Apparent Distance is *less* than 90°, the Second Correction is to be taken from the Bottom.

TABLE XVII.

Logarithms of the First and Second Corrections

The First Correction is *always* to be taken from the Top, and also the Second, when the Apparent Distance is *greater* than 90°.

2 DEGREES.

S.	24′	25′	26′	27′	28′	29′	30′	31′	32′	33′	34′	35′	
0	1.0621	1.0649	1.0678	1.0706	1.0734	1.0763	1.0792	1.0821	1.0850	1.0880	1.0909	1.0939	60
1	0622	0650	0678	0706	0735	0763	0792	0821	0851	0880	0910	0940	59
2	0622	0650	0678	0707	0735	0764	0793	0822	0851	0881	0910	0940	58
3	0623	0651	0679	0707	0736	0764	0793	0822	0852	0881	0911	0941	57
4	0623	0651	0679	0708	0736	0765	0794	0823	0852	0882	0911	0941	56
5	1.0624	1.0652	1.0680	1.0708	1.0737	1.0765	1.0794	1.0823	1.0853	1.0882	1.0912	1.0942	55
6	0624	0652	0680	0709	0737	0766	0795	0824	0853	0883	0912	0942	54
7	0625	0653	0681	0709	0738	0766	0795	0824	0854	0883	0913	0943	53
8	0625	0653	0681	0710	0738	0767	0796	0825	0854	0883	0913	0943	52
9	0626	0654	0682	0710	0739	0767	0796	0825	0855	0884	0914	0944	51
10	1.0626	1.0654	1.0682	1.0711	1.0739	1.0768	1.0797	1.0826	1.0855	1.0884	1.0914	1.0944	50
11	0627	0655	0683	0711	0740	0768	0797	0826	0855	0885	0915	0945	49
12	0627	0655	0683	0711	0740	0769	0798	0827	0856	0885	0915	0945	48
13	0628	0655	0684	0712	0740	0769	0798	0827	0856	0886	0916	0946	47
14	0628	0656	0684	0712	0741	0770	0799	0828	0857	0886	0916	0946	46
15	1.0628	1.0656	1.0685	1.0713	1.0741	1.0770	1.0799	1.0828	1.0857	1.0887	1.0917	1.0947	45
16	0629	0657	0685	0713	0742	0771	0800	0829	0858	0887	0917	0947	44
17	0629	0657	0686	0714	0742	0771	0800	0829	0858	0888	0918	0948	43
18	0630	0658	0686	0714	0743	0772	0801	0830	0859	0888	0918	0948	42
19	0630	0658	0686	0715	0743	0772	0801	0830	0859	0889	0919	0949	41
20	1.0631	1.0659	1.0687	1.0715	1.0744	1.0773	1.0801	1.0831	1.0860	1.0889	1.0919	1.0949	40
21	0631	0659	0687	0716	0744	0773	0802	0831	0860	0890	0920	0950	39
22	0632	0660	0688	0716	0745	0774	0802	0832	0861	0890	0920	0950	38
23	0632	0660	0688	0717	0745	0774	0803	0832	0861	0891	0921	0951	37
24	0633	0661	0689	0717	0746	0774	0803	0833	0862	0891	0921	0951	36
25	1.0633	1.0661	1.0689	1.0718	1.0746	1.0775	1.0804	1.0833	1.0862	1.0892	1.0922	1.0952	35
26	0634	0662	0690	0718	0747	0775	0804	0834	0863	0893	0922	0952	34
27	0634	0662	0690	0719	0747	0776	0805	0834	0863	0893	0923	0953	33
28	0634	0663	0691	0719	0748	0776	0805	0834	0864	0894	0923	0953	32
29	0635	0663	0691	0720	0748	0777	0806	0835	0864	0894	0924	0954	31
30	1.0635	1.0663	1.0692	1.0720	1.0749	1.0777	1.0806	1.0835	1.0865	1.0895	1.0924	1.0954	30
31	0636	0664	0692	0721	0749	0778	0807	0836	0865	0895	0925	0955	29
32	0636	0664	0693	0721	0750	0778	0807	0836	0866	0896	0925	0955	28
33	0637	0665	0693	0721	0750	0779	0808	0837	0866	0896	0926	0956	27
34	0637	0665	0694	0722	0751	0779	0808	0837	0867	0897	0926	0956	26
35	1.0638	1.0666	1.0694	1.0722	1.0751	1.0780	1.0809	1.0838	1.0867	1.0897	1.0927	1.0957	25
36	0638	0666	0694	0723	0751	0780	0809	0838	0868	0898	0927	0957	24
37	0639	0667	0695	0723	0752	0781	0810	0839	0868	0898	0928	0958	23
38	0639	0667	0695	0724	0752	0781	0810	0839	0869	0899	0928	0958	22
39	0640	0668	0696	0724	0753	0782	0811	0840	0869	0899	0929	0959	21
40	1.0640	1.0668	1.0696	1.0725	1.0753	1.0782	1.0811	1.0840	1.0870	1.0899	1.0929	1.0959	20
41	0641	0669	0697	0725	0754	0783	0812	0841	0870	0900	0930	0960	19
42	0641	0669	0697	0726	0754	0783	0812	0841	0871	0900	0930	0960	18
43	0641	0670	0698	0726	0755	0784	0813	0842	0871	0901	0931	0961	17
44	0642	0670	0698	0727	0755	0784	0813	0842	0872	0901	0931	0961	16
45	1.0642	1.0670	1.0699	1.0727	1.0756	1.0785	1.0814	1.0843	1.0872	1.0902	1.0932	1.0962	15
46	0643	0671	0699	0728	0756	0785	0814	0843	0873	0902	0932	0962	14
47	0643	0671	0700	0728	0757	0786	0815	0844	0873	0903	0933	0963	13
48	0644	0672	0700	0729	0757	0786	0815	0844	0874	0903	0933	0963	12
49	0644	0672	0701	0729	0758	0787	0816	0845	0874	0904	0934	0964	11
50	1.0645	1.0673	1.0701	1.0730	1.0758	1.0787	1.0816	1.0845	1.0875	1.0904	1.0934	1.0964	10
51	0645	0673	0702	0730	0759	0787	0816	0846	0875	0905	0935	0965	9
52	0646	0674	0702	0730	0759	0788	0817	0846	0876	0905	0935	0965	8
53	0646	0674	0703	0731	0760	0788	0817	0847	0876	0906	0936	0966	7
54	0647	0675	0703	0731	0760	0789	0818	0847	0877	0906	0936	0966	6
55	1.0647	1.0675	1.0703	1.0732	1.0761	1.0789	1.0818	1.0848	1.0877	1.0907	1.0937	1.0967	5
56	0648	0676	0704	0732	0761	0790	0819	0848	0878	0907	0937	0967	4
57	0648	0676	0704	0733	0762	0790	0819	0849	0878	0908	0938	0968	3
58	0648	0677	0705	0733	0762	0791	0820	0849	0879	0908	0938	0968	2
59	0649	0677	0705	0734	0762	0791	0820	0850	0879	0909	0939	0969	1
60	0649	0678	0706	0734	0763	0792	0821	0850	0880	0909	0939	0969	0
	35′	34′	33′	32′	31′	30′	29′	28′	27′	26′	25′	24′	S.

7 DEGREES.

When the Apparent Distance is *less* than 90°, the Second Correction is to be taken from the Bottom.

TABLE XVII.

Logarithms of the First and Second Corrections.

The First Correction is *always* to be taken from the Top, and also the Second, when the Apparent Distance is *greater* than 90°.

2 DEGREES.

S.	36′	37′	38′	39′	40′	41′	42′	43′	44′	45′	46′	47′	
0	1.0969	1.0999	1.1030	1.1061	1.1091	1.1123	1.1154	1.1186	1.1217	1.1249	1.1282	1.1314	60
1	0970	1000	1030	1061	1092	1123	1154	1186	1218	1250	1282	1315	59
2	0970	1000	1031	1062	1092	1124	1155	1187	1218	1250	1283	1315	58
3	0971	1001	1031	1062	1093	1124	1156	1187	1219	1251	1283	1316	57
4	0971	1001	1032	1063	1094	1125	1156	1188	1219	1252	1284	1316	56
5	1.0972	1.1002	1.1032	1.1063	1.1094	1.1125	1.1157	1.1188	1.1220	1.1252	1.1284	1.1317	55
6	0972	1002	1032	1064	1095	1126	1157	1189	1221	1253	1285	1317	54
7	0973	1003	1033	1064	1095	1126	1158	1189	1221	1253	1285	1318	53
8	0973	1003	1034	1065	1096	1127	1158	1190	1222	1254	1286	1319	52
9	0974	1004	1034	1065	1096	1127	1159	1190	1222	1254	1287	1319	51
10	1.0974	1.1004	1.1035	1.1066	1.1097	1.1128	1.1159	1.1191	1.1223	1.1255	1.1287	1.1320	50
11	0975	1005	1035	1066	1097	1128	1160	1191	1223	1255	1288	1320	49
12	0975	1005	1036	1067	1098	1129	1160	1192	1224	1256	1288	1321	48
13	0976	1006	1036	1067	1098	1129	1161	1192	1224	1256	1289	1321	47
14	0976	1006	1037	1068	1099	1130	1161	1193	1225	1257	1289	1322	46
15	1.0977	1.1007	1.1037	1.1068	1.1099	1.1130	1.1162	1.1193	1.1225	1.1257	1.1290	1.1322	45
16	0977	1007	1038	1069	1100	1131	1162	1194	1226	1258	1290	1323	44
17	0978	1008	1039	1069	1100	1131	1163	1195	1226	1259	1291	1323	43
18	0978	1008	1039	1070	1101	1132	1163	1195	1227	1259	1291	1324	42
19	0979	1009	1040	1070	1101	1132	1164	1196	1227	1260	1292	1325	41
20	1.0979	1.1009	1.1040	1.1071	1.1102	1.1133	1.1164	1.1196	1.1228	1.1260	1.1292	1.1325	40
21	0980	1010	1041	1071	1102	1134	1165	1197	1229	1261	1293	1326	39
22	0980	1011	1041	1072	1103	1134	1165	1197	1229	1261	1294	1326	38
23	0981	1011	1042	1072	1103	1135	1166	1198	1230	1262	1294	1327	37
24	0981	1012	1042	1073	1104	1135	1167	1198	1230	1262	1295	1327	36
25	1.0982	1.1012	1.1043	1.1073	1.1104	1.1136	1.1167	1.1199	1.1231	1.1263	1.1295	1.1328	35
26	0982	1013	1043	1074	1105	1136	1168	1199	1231	1264	1296	1328	34
27	0983	1013	1044	1074	1105	1137	1168	1200	1232	1264	1296	1329	33
28	0983	1014	1044	1075	1106	1137	1169	1200	1232	1265	1297	1329	32
29	0984	1014	1045	1075	1106	1138	1169	1201	1233	1265	1297	1330	31
30	1.0984	1.1015	1.1045	1.1076	1.1107	1.1138	1.1170	1.1201	1.1233	1.1266	1.1298	1.1331	30
31	0985	1016	1046	1076	1108	1139	1170	1202	1234	1266	1298	1331	29
32	0985	1016	1046	1077	1108	1139	1171	1202	1234	1267	1299	1332	28
33	0986	1017	1047	1078	1109	1140	1171	1203	1235	1267	1300	1332	27
34	0986	1017	1047	1078	1110	1140	1172	1204	1235	1268	1300	1333	26
35	1.0987	1.1018	1.1048	1.1079	1.1110	1.1141	1.1172	1.1204	1.1236	1.1268	1.1301	1.1333	25
36	0987	1018	1048	1079	1111	1141	1173	1205	1237	1269	1301	1334	24
37	0988	1019	1049	1080	1111	1142	1173	1205	1237	1269	1302	1334	23
38	0988	1019	1049	1080	1112	1142	1174	1206	1238	1270	1302	1335	22
39	0989	1020	1050	1081	1112	1143	1174	1206	1238	1270	1303	1335	21
40	1.0989	1.1020	1.1050	1.1081	1.1112	1.1143	1.1175	1.1207	1.1239	1.1271	1.1303	1.1336	20
41	0990	1021	1051	1082	1113	1144	1175	1207	1239	1271	1304	1337	19
42	0990	1021	1051	1082	1113	1145	1176	1208	1240	1272	1304	1337	18
43	0991	1022	1052	1083	1114	1145	1177	1208	1240	1273	1305	1338	17
44	0991	1022	1052	1083	1114	1146	1177	1209	1241	1273	1306	1338	16
45	1.0992	1.1023	1.1053	1.1084	1.1115	1.1146	1.1178	1.1209	1.1241	1.1274	1.1306	1.1339	15
46	0992	1023	1053	1084	1115	1147	1178	1210	1242	1274	1307	1339	14
47	0993	1024	1054	1085	1116	1147	1179	1210	1242	1275	1307	1340	13
48	0993	1024	1054	1085	1116	1148	1179	1211	1243	1275	1308	1340	12
49	0994	1025	1055	1086	1117	1148	1180	1211	1243	1276	1308	1341	11
50	1.0994	1.1025	1.1055	1.1086	1.1117	1.1149	1.1180	1.1212	1.1244	1.1276	1.1309	1.1342	10
51	0995	1026	1056	1087	1118	1149	1181	1213	1245	1277	1309	1342	9
52	0995	1026	1056	1087	1118	1150	1181	1213	1245	1277	1310	1343	8
53	0996	1027	1057	1088	1119	1150	1182	1214	1246	1278	1310	1343	7
54	0996	1027	1057	1088	1119	1151	1182	1214	1246	1278	1311	1344	6
55	1.0997	1.1028	1.1058	1.1089	1.1120	1.1151	1.1183	1.1215	1.1247	1.1279	1.1311	1.1344	5
56	0997	1028	1058	1089	1120	1152	1183	1215	1247	1280	1312	1345	4
57	0998	1028	1059	1090	1121	1152	1184	1216	1248	1280	1313	1345	3
58	0998	1029	1060	1090	1122	1153	1184	1216	1248	1281	1313	1346	2
59	0999	1029	1060	1091	1122	1153	1185	1217	1249	1281	1314	1346	1
60	0999	1030	1061	1091	1123	1154	1186	1217	1249	1282	1314	1347	0
	23′	22′	21′	20′	19′	18′	17′	16′	15′	14′	13′	12′	S.

7 DEGREES.

When the Apparent Distance is *less* than 90°, the Second Correction is to be taken from the Bottom.

TABLE XVII.

Logarithms of the First and Second Corrections

The First Correction is *always* to be taken from the Top, and also the Second, when the Apparent Distance is *greater* than 90°.

S.	2 DEGREES. 48′	49′	50′	51′	52′	53′	54′	55′	56′	57′	58′	59′	
0	1.1347	1.1380	1.1413	1.1447	1.1481	1.1515	1.1549	1.1584	1.1619	1.1654	1.1689	1.1725	60
1	1348	1381	1414	1447	1481	1515	1550	1584	1619	1654	1690	1725	59
2	1348	1381	1414	1448	1482	1516	1550	1585	1620	1655	1690	1726	58
3	1349	1382	1415	1449	1482	1516	1551	1585	1620	1655	1691	1727	57
4	1349	1382	1416	1449	1483	1517	1551	1586	1621	1656	1692	1727	56
5	1.1350	1.1383	1.1416	1.1450	1.1483	1.1518	1.1552	1.1587	1.1621	1.1657	1.1692	1.1728	55
6	1350	1383	1417	1450	1484	1518	1552	1587	1622	1657	1693	1728	54
7	1351	1384	1417	1451	1485	1519	1553	1588	1623	1658	1693	1729	53
8	1351	1384	1418	1451	1485	1519	1554	1588	1623	1658	1694	1730	52
9	1352	1385	1418	1452	1486	1520	1554	1589	1624	1659	1694	1730	51
10	1.1352	1.1386	1.1419	1.1452	1.1486	1.1520	1.1555	1.1589	1.1624	1.1660	1.1695	1.1731	50
11	1353	1386	1419	1453	1487	1521	1555	1590	1625	1660	1696	1731	49
12	1354	1387	1420	1454	1487	1522	1556	1591	1625	1661	1696	1732	48
13	1354	1387	1421	1454	1488	1522	1556	1591	1626	1661	1697	1733	47
14	1355	1388	1421	1455	1489	1523	1557	1592	1627	1662	1697	1733	46
15	1.1355	1.1388	1.1422	1.1455	1.1489	1.1523	1.1558	1.1592	1.1627	1.1663	1.1698	1.1734	45
16	1356	1389	1422	1456	1490	1524	1558	1593	1628	1663	1699	1734	44
17	1356	1389	1423	1456	1490	1524	1559	1593	1628	1664	1699	1735	43
18	1357	1390	1423	1457	1491	1525	1559	1594	1629	1664	1700	1736	42
19	1357	1391	1424	1458	1491	1526	1560	1595	1630	1665	1700	1736	41
20	1.1358	1.1391	1.1424	1.1458	1.1492	1.1526	1.1561	1.1595	1.1630	1.1665	1.1701	1.1737	40
21	1359	1392	1425	1459	1493	1527	1561	1596	1631	1666	1702	1737	39
22	1359	1392	1426	1459	1493	1527	1562	1596	1631	1667	1702	1738	38
23	1360	1393	1426	1460	1494	1528	1562	1597	1632	1667	1703	1739	37
24	1360	1393	1427	1460	1494	1528	1563	1598	1633	1668	1703	1739	36
25	1.1361	1.1394	1.1427	1.1461	1.1495	1.1529	1.1563	1.1598	1.1633	1.1668	1.1704	1.1740	35
26	1361	1394	1428	1461	1495	1530	1564	1599	1634	1669	1705	1740	34
27	1362	1395	1428	1462	1496	1530	1565	1599	1634	1670	1705	1741	33
28	1362	1396	1429	1463	1496	1531	1565	1600	1635	1670	1706	1742	32
29	1363	1396	1429	1463	1497	1531	1566	1600	1635	1671	1706	1742	31
30	1.1363	1.1397	1.1430	1.1464	1.1498	1.1532	1.1566	1.1601	1.1636	1.1671	1.1707	1.1743	30
31	1364	1397	1431	1464	1498	1532	1567	1602	1637	1672	1708	1743	29
32	1365	1398	1431	1465	1499	1533	1567	1602	1637	1673	1708	1744	28
33	1365	1398	1432	1465	1499	1534	1568	1603	1638	1673	1709	1745	27
34	1366	1399	1432	1466	1500	1534	1569	1603	1638	1674	1709	1745	26
35	1.1366	1.1399	1.1433	1.1467	1.1500	1.1535	1.1569	1.1604	1.1639	1.1675	1.1710	1.1746	25
36	1367	1400	1433	1467	1501	1535	1570	1605	1640	1675	1711	1746	24
37	1367	1401	1434	1468	1502	1536	1570	1605	1640	1676	1711	1747	23
38	1368	1401	1435	1468	1502	1536	1571	1606	1641	1676	1712	1748	22
39	1368	1402	1435	1469	1503	1537	1571	1606	1641	1677	1712	1748	21
40	1.1369	1.1402	1.1436	1.1469	1.1503	1.1538	1.1572	1.1607	1.1642	1.1677	1.1713	1.1749	20
41	1370	1403	1436	1470	1504	1538	1573	1607	1643	1678	1714	1749	19
42	1370	1403	1437	1470	1504	1539	1573	1608	1643	1678	1714	1750	18
43	1371	1404	1437	1471	1505	1539	1574	1609	1644	1679	1715	1751	17
44	1371	1404	1438	1472	1506	1540	1574	1609	1644	1680	1715	1751	16
45	1.1372	1.1405	1.1438	1.1472	1.1506	1.1540	1.1575	1.1610	1.1645	1.1680	1.1716	1.1752	15
46	1372	1405	1439	1473	1507	1541	1576	1610	1645	1681	1717	1752	14
47	1373	1406	1440	1473	1507	1542	1576	1611	1646	1681	1717	1753	13
48	1373	1406	1440	1474	1508	1542	1577	1612	1647	1682	1718	1754	12
49	1374	1407	1441	1474	1508	1543	1577	1612	1647	1683	1718	1754	11
50	1.1374	1.1407	1.1441	1.1475	1.1509	1.1543	1.1578	1.1613	1.1648	1.1683	1.1719	1.1755	10
51	1375	1408	1442	1476	1510	1544	1578	1613	1648	1684	1719	1755	9
52	1376	1408	1442	1476	1510	1544	1579	1614	1649	1684	1720	1756	8
53	1376	1409	1443	1477	1511	1545	1580	1614	1650	1685	1721	1757	7
54	1377	1409	1443	1477	1511	1546	1580	1615	1650	1686	1721	1757	6
55	1.1377	1.1410	1.1444	1.1478	1.1512	1.1546	1.1581	1.1616	1.1651	1.1686	1.1722	1.1758	5
56	1378	1411	1445	1478	1512	1547	1581	1616	1651	1687	1722	1759	4
57	1378	1411	1445	1479	1513	1547	1582	1617	1652	1687	1723	1759	3
58	1379	1412	1446	1479	1514	1548	1582	1617	1652	1688	1724	1760	2
59	1379	1412	1446	1480	1514	1548	1583	1618	1653	1689	1724	1760	1
60	1380	1413	1447	1481	1515	1549	1584	1619	1654	1689	1725	1761	0
	11′	10′	9′	8′	7′	6′	5′	4′	3′	2′	1′	0′	S.

7 DEGREES.

When the Apparent Distance is *less* than 90°, the Second Correction is to be taken from the Bottom.

TABLE XVII.

Logarithms of the First and Second Corrections.

The First Correction is *always* to be taken from the Top, and also the Second, when the Apparent Distance is *greater* than 90°.

3 DEGREES.

S.	0′	1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	
0	1.1761	1.1797	1.1834	1.1871	1.1908	1.1946	1.1984	1.2022	1.2061	1.2099	1.2139	1.2178	60
1	1762	1798	1835	1871	1909	1946	1984	2023	2061	2100	2139	2179	59
2	1762	1798	1835	1872	1909	1947	1985	2023	2062	2101	2140	2180	58
3	1763	1799	1836	1873	1910	1948	1986	2024	2062	2101	2141	2180	57
4	1763	1800	1836	1873	1911	1948	1986	2025	2063	2102	2141	2181	56
5	1.1764	1.1800	1.1837	1.1874	1.1911	1.1949	1.1987	1.2025	1.2064	1.2103	1.2142	1.2182	55
6	1765	1801	1838	1875	1912	1950	1987	2026	2064	2103	2143	2182	54
7	1765	1802	1838	1875	1913	1950	1988	2026	2065	2104	2143	2183	53
8	1766	1802	1839	1876	1913	1951	1989	2027	2066	2105	2144	2184	52
9	1766	1803	1839	1876	1914	1951	1989	2028	2066	2105	2145	2184	51
10	1.1767	1.1803	1.1840	1.1877	1.1914	1.1952	1.1990	1.2028	1.2067	1.2106	1.2145	1.2185	50
11	1768	1804	1841	1878	1915	1953	1991	2029	2068	2107	2146	2186	49
12	1768	1805	1841	1878	1916	1953	1991	2030	2068	2107	2147	2186	48
13	1769	1805	1842	1879	1916	1954	1992	2030	2069	2108	2147	2187	47
14	1769	1806	1843	1880	1917	1955	1993	2031	2070	2109	2148	2188	46
15	1.1770	1.1806	1.1843	1.1880	1.1918	1.1955	1.1994	1.2032	1.2070	1.2109	1.2149	1.2188	45
16	1771	1807	1844	1881	1918	1956	1994	2032	2071	2110	2149	2189	44
17	1771	1808	1844	1881	1919	1956	1995	2033	2072	2111	2150	2190	43
18	1772	1808	1845	1882	1919	1957	1996	2033	2072	2111	2151	2190	42
19	1772	1809	1846	1883	1920	1958	1996	2034	2073	2112	2151	2191	41
20	1.1773	1.1809	1.1846	1.1883	1.1921	1.1959	1.1997	1.2035	1.2073	1.2113	1.2152	1.2192	40
21	1774	1810	1847	1884	1921	1960	1997	2035	2074	2113	2153	2192	39
22	1774	1811	1847	1884	1922	1960	1998	2036	2075	2114	2153	2193	38
23	1775	1811	1848	1885	1923	1961	1998	2037	2075	2115	2154	2194	37
24	1775	1812	1849	1886	1923	1962	1999	2037	2076	2115	2155	2194	36
25	1.1776	1.1812	1.1849	1.1886	1.1924	1.1962	1.2000	1.2038	1.2077	1.2116	1.2155	1.2195	35
26	1777	1813	1850	1887	1924	1963	2000	2039	2078	2116	2156	2196	34
27	1777	1814	1850	1888	1925	1963	2001	2039	2079	2117	2157	2196	33
28	1778	1814	1851	1888	1926	1964	2001	2040	2079	2118	2157	2197	32
29	1778	1815	1852	1889	1926	1964	2002	2041	2080	2118	2158	2198	31
30	1.1779	1.1816	1.1852	1.1889	1.1927	1.1965	1.2003	1.2041	1.2080	1.2119	1.2159	1.2198	30
31	1780	1816	1853	1890	1928	1965	2003	2042	2081	2120	2159	2199	29
32	1780	1817	1854	1891	1928	1966	2004	2042	2081	2120	2160	2200	28
33	1781	1817	1854	1891	1929	1967	2005	2043	2082	2121	2161	2200	27
34	1781	1818	1855	1892	1929	1967	2005	2044	2083	2122	2161	2201	26
35	1.1782	1.1819	1.1856	1.1893	1.1930	1.1968	1.2006	1.2044	1.2083	1.2122	1.2162	1.2202	25
36	1783	1819	1857	1893	1931	1968	2007	2045	2084	2123	2163	2202	24
37	1783	1820	1857	1894	1931	1969	2007	2046	2085	2124	2163	2203	23
38	1784	1820	1858	1894	1932	1970	2008	2046	2085	2124	2164	2204	22
39	1785	1821	1858	1895	1933	1970	2009	2047	2086	2125	2165	2204	21
40	1.1785	1.1822	1.1859	1.1896	1.1933	1.1971	1.2009	1.2048	1.2086	1.2126	1.2165	1.2205	20
41	1786	1822	1859	1896	1934	1972	2010	2048	2087	2126	2166	2206	19
42	1786	1823	1860	1897	1934	1972	2010	2049	2088	2127	2167	2206	18
43	1787	1823	1860	1898	1935	1973	2011	2050	2088	2128	2167	2207	17
44	1788	1824	1861	1898	1936	1974	2012	2050	2089	2128	2168	2208	16
45	1.1788	1.1825	1.1862	1.1899	1.1936	1.1974	1.2012	1.2051	1.2090	1.2129	1.2169	1.2208	15
46	1789	1825	1862	1899	1937	1975	2013	2052	2090	2130	2169	2209	14
47	1789	1826	1863	1900	1938	1975	2014	2052	2091	2130	2170	2210	13
48	1790	1827	1863	1901	1938	1976	2014	2053	2092	2131	2170	2210	12
49	1791	1827	1864	1901	1939	1977	2015	2053	2092	2132	2171	2211	11
50	1.1791	1.1828	1.1865	1.1902	1.1939	1.1977	1.2016	1.2054	1.2093	1.2132	1.2172	1.2212	10
51	1792	1828	1865	1903	1940	1978	2016	2055	2094	2133	2172	2212	9
52	1792	1829	1866	1903	1941	1979	2017	2055	2094	2134	2173	2213	8
53	1793	1830	1867	1904	1941	1979	2017	2056	2095	2134	2174	2214	7
54	1794	1830	1867	1904	1942	1980	2018	2057	2096	2135	2174	2214	6
55	1.1794	1.1831	1.1868	1.1905	1.1942	1.1981	1.2019	1.2057	1.2096	1.2136	1.2175	1.2215	5
56	1795	1831	1868	1906	1943	1981	2019	2058	2097	2136	2176	2216	4
57	1795	1832	1869	1906	1944	1982	2020	2059	2098	2137	2176	2216	3
58	1796	1833	1870	1907	1944	1982	2021	2059	2098	2137	2177	2217	2
59	1797	1833	1870	1908	1945	1983	2021	2060	2099	2138	2178	2218	1
60	1797	1834	1871	1908	1946	1984	2022	2061	2099	2139	2178	2218	0
	59′	58′	57′	56′	55′	54′	53′	52′	51′	50′	49′	48′	S.

6 DEGREES.

When the Apparent Distance is *less* than 90°, the Second Correction is to be taken from the Bottom.

TABLE XVII.

Logarithms of the First and Second Corrections.

The First Correction is *always* to be taken from the Top, and also the Second, when the Apparent Distance is *greater* than 90°.

3 DEGREES.

S.	12′	13′	14′	15′	16′	17′	18′	19′	20′	21′	22′	23′	
0	1.2218	1.2259	1.2300	1.2341	1.2382	1.2424	1.2467	1.2510	1.2553	1.2596	1.2640	1.2685	60
1	2219	2260	2300	2342	2383	2425	2467	2510	2553	2597	2641	2686	59
2	2220	2260	2301	2342	2384	2426	2468	2511	2554	2598	2642	2687	58
3	2220	2261	2302	2343	2384	2426	2469	2512	2555	2599	2643	2688	57
4	2221	2262	2302	2344	2385	2427	2470	2512	2556	2599	2643	2688	56
5	1.2222	1.2262	1.2303	1.2344	1.2386	1.2428	1.2470	1.2513	1.2556	1.2600	1.2644	1.2689	55
6	2223	2263	2304	2345	2387	2429	2471	2514	2557	2601	2645	2689	54
7	2223	2264	2304	2346	2387	2429	2472	2515	2558	2601	2646	2690	53
8	2224	2264	2305	2346	2388	2430	2472	2515	2559	2602	2646	2691	52
9	2225	2265	2306	2347	2389	2431	2473	2516	2559	2603	2647	2692	51
10	1.2225	1.2266	1.2307	1.2348	1.2389	1.2431	1.2474	1.2517	1.2560	1.2604	1.2648	1.2692	50
11	2226	2266	2307	2348	2390	2432	2475	2517	2561	2604	2649	2693	49
12	2227	2267	2308	2349	2391	2433	2475	2518	2561	2605	2649	2694	48
13	2227	2268	2309	2350	2391	2433	2476	2519	2562	2606	2650	2695	47
14	2228	2268	2309	2350	2392	2434	2477	2520	2563	2607	2651	2695	46
15	1.2229	1.2269	1.2310	1.2351	1.2393	1.2435	1.2477	1.2520	1.2564	1.2607	1.2652	1.2696	45
16	2229	2270	2311	2352	2394	2436	2478	2521	2564	2608	2652	2697	44
17	2230	2270	2312	2353	2394	2436	2479	2522	2565	2609	2653	2698	43
18	2231	2271	2313	2353	2395	2437	2480	2522	2566	2610	2654	2698	42
19	2231	2272	2313	2354	2396	2438	2480	2523	2566	2610	2655	2699	41
20	1.2232	1.2272	1.2314	1.2355	1.2396	1.2438	1.2481	1.2524	1.2567	1.2611	1.2655	1.2700	40
21	2233	2273	2315	2355	2397	2439	2482	2525	2568	2612	2656	2701	39
22	2233	2274	2315	2356	2398	2440	2482	2525	2569	2612	2657	2701	38
23	2234	2274	2316	2357	2398	2441	2483	2526	2569	2613	2657	2702	37
24	2235	2275	2317	2357	2399	2441	2484	2527	2570	2614	2658	2703	36
25	1.2235	1.2276	1.2317	1.2358	1.2400	1.2442	1.2485	1.2527	1.2571	1.2615	1.2659	1.2704	35
26	2236	2277	2318	2359	2401	2443	2485	2528	2572	2615	2660	2704	34
27	2237	2277	2319	2359	2401	2443	2486	2529	2572	2616	2660	2705	33
28	2237	2278	2320	2360	2402	2444	2487	2530	2573	2617	2661	2706	32
29	2238	2279	2320	2361	2403	2445	2487	2530	2574	2618	2662	2707	31
30	1.2239	1.2279	1.2321	1.2362	1.2403	1.2445	1.2488	1.2531	1.2574	1.2618	1.2663	1.2707	30
31	2239	2280	2321	2362	2404	2446	2489	2532	2575	2619	2663	2708	29
32	2240	2281	2322	2363	2405	2447	2489	2533	2576	2620	2664	2709	28
33	2241	2281	2322	2364	2405	2448	2490	2533	2577	2621	2665	2710	27
34	2241	2282	2323	2364	2406	2448	2491	2534	2577	2621	2666	2710	26
35	1.2242	1.2283	1.2324	1.2365	1.2407	1.2449	1.2492	1.2535	1.2578	1.2622	1.2666	1.2711	25
36	2243	2283	2324	2366	2408	2450	2492	2535	2579	2623	2667	2712	24
37	2243	2284	2325	2366	2408	2450	2493	2536	2580	2624	2668	2713	23
38	2244	2285	2326	2367	2409	2451	2494	2537	2580	2624	2669	2713	22
39	2245	2285	2326	2368	2410	2452	2494	2538	2581	2625	2669	2714	21
40	1.2245	1.2286	1.2327	1.2368	1.2410	1.2453	1.2495	1.2538	1.2582	1.2626	1.2670	1.2715	20
41	2246	2287	2328	2369	2411	2453	2496	2539	2583	2626	2671	2716	19
42	2247	2287	2328	2370	2412	2454	2497	2540	2583	2627	2672	2716	18
43	2247	2288	2329	2371	2412	2455	2497	2540	2584	2628	2672	2717	17
44	2248	2289	2330	2371	2413	2455	2498	2541	2585	2629	2673	2718	16
45	1.2249	1.2289	1.2331	1.2372	1.2414	1.2456	1.2499	1.2542	1.2585	1.2629	1.2674	1.2719	15
46	2249	2290	2331	2373	2415	2457	2499	2543	2586	2630	2675	2719	14
47	2250	2291	2332	2373	2415	2458	2500	2543	2587	2631	2675	2720	13
48	2251	2291	2333	2374	2416	2458	2501	2544	2588	2632	2676	2721	12
49	2251	2292	2333	2375	2417	2459	2502	2545	2588	2632	2677	2722	11
50	1.2252	1.2293	1.2334	1.2375	1.2417	1.2460	1.2502	1.2545	1.2589	1.2633	1.2678	1.2722	10
51	2253	2294	2335	2376	2418	2460	2503	2546	2590	2634	2678	2723	9
52	2253	2294	2335	2377	2419	2461	2504	2547	2591	2635	2679	2724	8
53	2254	2295	2336	2378	2419	2462	2504	2548	2591	2635	2680	2725	7
54	2255	2296	2337	2378	2420	2462	2505	2548	2592	2636	2681	2725	6
55	1.2256	1.2296	1.2337	1.2379	1.2421	1.2463	1.2506	1.2549	1.2593	1.2637	1.2681	1.2726	5
56	2256	2297	2338	2380	2422	2464	2507	2550	2593	2638	2682	2727	4
57	2257	2298	2339	2380	2422	2465	2507	2551	2594	2638	2683	2728	3
58	2258	2298	2339	2381	2423	2465	2508	2551	2595	2639	2684	2729	2
59	2258	2299	2340	2382	2424	2466	2509	2552	2596	2640	2684	2729	1
60	2259	2300	2341	2382	2424	2467	2510	2553	2596	2640	2685	2730	0
	47′	46′	45′	44′	43′	42′	41′	40′	39′	38′	37′	36′	S.

6 DEGREES.

When the Apparent Distance is *less* than 90°, the Second Correction is to be taken from the Bottom.

TABLE XVII.

Logarithms of the First and Second Corrections

The First Correction is *always* to be taken from the Top, and also the Second, when the Apparent Distance is *greater* than 90°.

5 DEGREES.

S.	24′	25′	26′	27′	28′	29′	30′	31′	32′	33′	34′	35′	
0	1.2730	1.2775	1.2821	1.2868	1.2915	1.2962	1.3010	1.3059	1.3108	1.3158	1.3208	1.3259	60
1	2731	2776	2822	2869	2916	2963	3011	3060	3109	3158	3209	3259	59
2	2732	2777	2823	2869	2916	2964	3012	3060	3110	3159	3209	3260	58
3	2732	2778	2824	2870	2917	2965	3013	3061	3110	3160	3210	3261	57
4	2733	2779	2825	2871	2918	2965	3014	3062	3111	3161	3211	3262	56
5	1.2734	1.2779	1.2825	1.2872	1.2919	1.2966	1.3014	1.3063	1.3112	1.3162	1.3212	1.3263	55
6	2735	2780	2826	2873	2920	2967	3015	3064	3113	3163	3213	3264	54
7	2735	2781	2827	2873	2920	2968	3016	3065	3114	3163	3214	3265	53
8	2736	2782	2828	2874	2921	2969	3017	3065	3114	3164	3214	3265	52
9	2737	2782	2828	2875	2922	2969	3018	3066	3115	3165	3215	3266	51
10	1.2738	1.2783	1.2829	1.2876	1.2923	1.2970	1.3018	1.3067	1.3116	1.3166	1.3216	1.3267	50
11	2738	2784	2830	2876	2924	2971	3019	3068	3117	3167	3217	3268	49
12	2739	2785	2831	2877	2924	2972	3020	3069	3118	3168	3218	3269	48
13	2740	2785	2831	2878	2925	2973	3021	3069	3119	3168	3219	3270	47
14	2741	2786	2832	2879	2926	2973	3022	3070	3119	3169	3220	3270	46
15	1.2741	1.2787	1.2833	1.2880	1.2927	1.2974	1.3022	1.3071	1.3120	1.3170	1.3220	1.3271	45
16	2742	2788	2834	2880	2927	2975	3023	3072	3121	3171	3221	3272	44
17	2743	2788	2835	2881	2928	2976	3024	3073	3122	3172	3222	3273	43
18	2744	2789	2835	2882	2929	2977	3025	3073	3123	3173	3223	3274	42
19	2744	2790	2836	2883	2930	2977	3026	3074	3124	3173	3224	3275	41
20	1.2745	1.2791	1.2837	1.2883	1.2931	1.2978	1.3026	1.3075	1.3124	1.3174	1.3225	1.3276	40
21	2746	2792	2838	2884	2931	2979	3027	3076	3125	3175	3225	3276	39
22	2747	2792	2838	2885	2932	2980	3028	3077	3126	3176	3226	3277	38
23	2747	2793	2839	2886	2933	2981	3029	3078	3127	3177	3227	3278	37
24	2748	2794	2840	2887	2934	2981	3030	3078	3128	3178	3228	3279	36
25	1.2749	1.2795	1.2841	1.2887	1.2935	1.2982	1.3030	1.3079	1.3129	1.3178	1.3229	1.3280	35
26	2750	2795	2841	2888	2935	2983	3031	3080	3129	3179	3230	3281	34
27	2750	2796	2842	2889	2936	2984	3032	3081	3130	3180	3231	3282	33
28	2751	2797	2843	2890	2937	2985	3033	3082	3131	3181	3231	3282	32
29	2752	2798	2844	2891	2938	2985	3034	3082	3132	3182	3232	3283	31
30	1.2753	1.2798	1.2845	1.2891	1.2939	1.2986	1.3034	1.3083	1.3132	1.3183	1.3233	1.3284	30
31	2753	2799	2845	2892	2939	2987	3035	3084	3133	3183	3234	3285	29
32	2754	2800	2846	2893	2940	2988	3036	3085	3134	3184	3235	3286	28
33	2755	2801	2847	2894	2941	2989	3037	3086	3135	3185	3236	3287	27
34	2756	2801	2848	2894	2942	2989	3038	3087	3136	3186	3236	3288	26
35	1.2756	1.2802	1.2848	1.2895	1.2942	1.2990	1.3039	1.3087	1.3137	1.3187	1.3237	1.3288	25
36	2757	2803	2849	2896	2943	2991	3039	3088	3138	3188	3238	3289	24
37	2758	2804	2850	2897	2944	2992	3040	3089	3138	3188	3239	3290	23
38	2759	2805	2851	2898	2945	2993	3041	3090	3139	3189	3240	3291	22
39	2760	2805	2852	2898	2946	2993	3042	3091	3140	3190	3241	3292	21
40	1.2760	1.2806	1.2852	1.2899	1.2946	1.2994	1.3043	1.3091	1.3141	1.3191	1.3242	1.3293	20
41	2761	2807	2853	2900	2947	2995	3043	3092	3142	3192	3242	3294	19
42	2762	2808	2854	2901	2948	2996	3044	3093	3143	3193	3243	3294	18
43	2763	2808	2855	2901	2949	2997	3045	3094	3143	3193	3244	3295	17
44	2763	2809	2855	2902	2950	2997	3046	3095	3144	3194	3245	3296	16
45	1.2764	1.2810	1.2856	1.2903	1.2950	1.2998	1.3047	1.3096	1.3145	1.3195	1.3246	1.3297	15
46	2765	2811	2857	2904	2951	2999	3047	3096	3146	3196	3247	3298	14
47	2766	2811	2858	2905	2952	3000	3048	3097	3147	3197	3247	3299	13
48	2766	2812	2859	2905	2953	3001	3049	3098	3148	3198	3248	3300	12
49	2767	2813	2859	2906	2954	3001	3050	3099	3148	3198	3249	3300	11
50	1.2768	1.2814	1.2860	1.2907	1.2954	1.3002	1.3051	1.3100	1.3149	1.3199	1.3250	1.3301	10
51	2769	2815	2861	2908	2955	3003	3052	3101	3150	3200	3251	3302	9
52	2769	2815	2862	2909	2956	3004	3052	3101	3151	3201	3252	3303	8
53	2770	2816	2862	2909	2957	3005	3053	3102	3152	3202	3253	3304	7
54	2771	2817	2863	2910	2958	3005	3054	3103	3153	3203	3253	3305	6
55	1.2772	1.2818	1.2864	1.2911	1.2958	1.3006	1.3055	1.3104	1.3153	1.3204	1.3254	1.3306	5
56	2772	2818	2865	2912	2959	3007	3056	3105	3154	3204	3255	3306	4
57	2773	2819	2866	2912	2960	3008	3056	3105	3155	3205	3256	3307	3
58	2774	2820	2866	2913	2961	3009	3057	3106	3156	3206	3257	3308	2
59	2775	2821	2867	2914	2962	3009	3058	3107	3157	3207	3258	3309	1
60	2775	2821	2868	2915	2962	3010	3059	3108	3158	3208	3259	3310	0
	35′	34′	33′	32′	31′	30′	29′	28′	27′	26′	25′	24′	S.

6 DEGREES.

When the Apparent Distance is *less* than 90°, the Second Correction is to be taken from the Bottom

TABLE XVII.

Logarithms of the First and Second Corrections.

The First Correction is *always* to be taken from the Top, and also the Second, when the Apparent Distance is *greater* than 90°.

3 DEGREES.

S.	36′	37′	38′	39′	40′	41′	42′	43′	44′	45′	46′	47′	
0	1.3310	1.3362	1.3415	1.3468	1.3522	1.3576	1.3632	1.3688	1.3745	1.3802	1.3860	1.3919	60
1	3311	3363	3415	3469	3523	3577	3633	3689	3746	3803	3861	3920	59
2	3312	3364	3416	3470	3524	3578	3634	3690	3746	3804	3862	3921	58
3	3313	3365	3417	3471	3525	3579	3635	3691	3747	3805	3863	3922	57
4	3313	3365	3418	3471	3525	3580	3635	3692	3748	3806	3864	3923	56
5	1.3314	1.3366	1.3419	1.3472	1.3526	1.3581	1.3636	1.3693	1.3749	1.3807	1.3865	1.3924	55
6	3315	3367	3420	3473	3527	3582	3637	3694	3750	3808	3866	3925	54
7	3316	3368	3421	3474	3528	3583	3638	3695	3751	3809	3867	3926	53
8	3317	3369	3422	3475	3529	3584	3639	3695	3752	3810	3868	3927	52
9	3318	3370	3423	3476	3530	3585	3640	3696	3753	3811	3869	3928	51
10	1.3319	1.3371	1.3423	1.3477	1.3531	1.3586	1.3641	1.3697	1.3754	1.3812	1.3870	1.3929	50
11	3319	3372	3424	3478	3532	3587	3642	3698	3755	3813	3871	3930	49
12	3320	3372	3425	3479	3533	3587	3643	3699	3756	3814	3872	3931	48
13	3321	3373	3426	3480	3534	3588	3644	3700	3757	3815	3873	3932	47
14	3322	3374	3427	3480	3535	3589	3645	3701	3758	3816	3874	3933	46
15	1.3323	1.3375	1.3428	1.3481	1.3535	1.3590	1.3646	1.3702	1.3759	1.3817	1.3875	1.3934	45
16	3324	3376	3429	3482	3536	3591	3647	3703	3760	3818	3876	3935	44
17	3325	3377	3430	3483	3537	3592	3648	3704	3761	3819	3877	3936	43
18	3325	3378	3431	3484	3538	3593	3649	3705	3762	3819	3878	3937	42
19	3326	3379	3431	3485	3539	3594	3649	3706	3763	3820	3879	3938	41
20	1.3327	1.3379	1.3432	1.3486	1.3540	1.3595	1.3650	1.3707	1.3764	1.3821	1.3880	1.3939	40
21	3328	3380	3433	3487	3541	3596	3651	3708	3765	3822	3881	3.40	39
22	3329	3381	3434	3488	3542	3597	3652	3709	3766	3823	3882	3941	38
23	3330	3382	3435	3488	3543	3598	3653	3709	3767	3824	3883	3942	37
24	3331	3383	3436	3489	3544	3598	3654	3710	3768	3825	3881	3943	36
25	1.3332	1.3384	1.3437	1.3490	1.3545	1.3599	1.3655	1.3711	1.3768	1.3825	1.3885	1.3944	35
26	3332	3385	3438	3491	3545	3600	3656	3712	3769	3827	3886	394.	34
27	3333	3386	3438	3492	3546	3601	3657	3713	3770	3828	3887	3946	33
28	3334	3386	3439	3493	3547	3602	3658	3714	3771	3829	3888	3947	32
29	3335	3387	3440	3494	3548	3603	3659	3715	3772	3830	3889	3948	31
30	1.3336	1.3388	1.3441	1.3495	1.3549	1.3604	1.3660	1.3716	1.3773	1.3831	1.3890	1.3949	30
31	3337	3389	3442	3496	3550	3605	3661	3717	3774	3832	3891	3950	29
32	3338	3390	3443	3497	3551	3606	3662	3718	3775	3833	3892	3951	28
33	3338	3391	3444	3498	3552	3607	3663	3719	3776	3834	3893	3952	27
34	3339	3392	3445	3499	3553	3608	3663	3720	3777	3835	3894	3953	26
35	1.3340	1.3393	1.3446	1.3500	1.3554	1.3609	1.3664	1.3721	1.3778	1.3836	1.3895	1.3954	25
36	3341	3393	3446	3501	3555	3610	3665	3722	3779	3837	3896	3955	24
37	3342	3394	3447	3502	3555	3610	3666	3723	3780	3838	3897	3956	23
38	3343	3395	3448	3503	3556	3611	3667	3724	3781	3839	3898	3957	22
39	3344	3396	3449	3504	3557	3612	3668	3725	3782	3840	3899	3958	21
40	1.3345	1.3397	1.3450	1.3505	1.3558	1.3613	1.3669	1.3726	1.3783	1.3841	1.3900	1.3959	20
41	3345	3398	3451	3506	3559	3614	3670	3727	3784	3842	3901	3960	19
42	3346	3399	3452	3506	3560	3615	3671	3727	3785	3843	3902	3961	18
43	3347	3400	3453	3507	3561	3616	3672	3728	3786	3844	3903	3962	17
44	3348	3400	3454	3508	3562	3617	3672	3729	3787	384.	3904	3963	16
45	1.3349	1.3401	1.3454	1.3509	1.3563	1.3618	1.3674	1.3730	1.3788	1.3846	1.3905	1.3964	15
46	3350	3402	3455	3510	3564	3619	3675	3731	3789	3847	3906	3965	14
47	3351	3403	3456	3511	3565	3620	3676	3732	3790	3848	3907	3966	13
48	3351	3404	3457	3512	3565	3621	3677	3733	3791	3849	3908	3967	12
49	3352	3405	3458	3513	3566	3622	3677	3734	3792	3850	3909	3968	11
50	1.3353	1.3406	1.3459	1.3513	1.3567	1.3623	1.3678	1.3735	1.3793	1.3851	1.3910	1.3969	10
51	3354	3407	3460	3514	3568	3623	3679	3736	3793	3852	3911	3970	9
52	3355	3408	3461	3515	3569	3624	3680	3737	3794	3853	3912	3971	8
53	3356	3408	3462	3516	3570	3625	3681	3738	3795	3854	3913	3972	7
54	3357	3409	3463	3516	3571	3626	3682	3739	3796	3855	3914	3972	6
55	1.3358	1.3410	1.3463	1.3517	1.3572	1.3627	1.3683	1.3740	1.3797	1.3856	1.3915	1.3974	5
56	3358	3411	3464	3518	3573	3628	3684	3741	3798	3856	3916	3975	4
57	3359	3412	3465	3519	3574	3629	3685	3742	3799	3857	3917	3976	3
58	3360	3413	3466	3520	3575	3630	3686	3743	3800	3858	3918	3977	2
59	3361	3414	3467	3521	3576	3631	3687	3744	3801	3859	3919	3978	1
60	3362	3415	3468	3522	3576	3632	3688	3745	3802	3860	3919	3979	0
	23′	22′	21′	20′	19′	18′	17′	16′	15′	14′	13′	12′	S.

6 DEGREES.

When the Apparent Distance is *less* than 90°, the Second Correction is to be taken from the Bottom

TABLE XVII.

Logarithms of the First and Second Corrections.

The First Correction is *always* to be taken from the Top, and also the Second, when the Apparent Distance is *greater* than 90°.

3 DEGREES.

S.	48′	49′	50′	51′	52′	53′	54′	55′	56′	57′	58′	59′	
0	1.3979	1.4040	1.4102	1.4164	1.4228	1.4292	1.4357	1.4424	1.4491	1.4559	1.4629	1.4699	60
1	3980	4041	4103	4165	4229	4293	4358	4425	4492	4560	4630	4701	59
2	3981	4042	4104	4166	4230	4294	4359	4426	4493	4562	4631	4702	58
3	3982	4043	4105	4167	4231	4295	4361	4427	4494	4563	4632	4703	57
4	3983	4044	4106	4168	4232	4296	4362	4428	4495	4564	4633	4704	56
5	1.3984	1.4045	1.4107	1.4169	1.4233	1.4297	1.4363	1.4429	1.4497	1.4565	1.4635	1.4705	55
6	3985	4046	4108	4171	4234	4298	4364	4430	4498	4566	4636	4707	54
7	3986	4047	4109	4172	4235	4300	4365	4431	4499	4567	4637	4708	53
8	3987	4048	4110	4173	4236	4301	4366	4433	4500	4569	4638	4709	52
9	3988	4049	4111	4174	4237	4302	4367	4434	4501	4570	4639	4710	51
10	1.3989	1.4050	1.4112	1.4175	1.4238	1.4303	1.4368	1.4435	1.4502	1.4571	1.4640	1.4711	50
11	3990	4051	4113	4176	4239	4304	4369	4436	4503	4572	4642	4712	49
12	3991	4052	4114	4177	4240	4305	4370	4437	4504	4573	4643	4714	48
13	3992	4053	4115	4178	4241	4306	4372	4438	4506	4574	4644	4715	47
14	3993	4054	4116	4179	4243	4307	4373	4439	4507	4575	4645	4716	46
15	1.3995	1.4055	1.4117	1.4180	1.4244	1.4308	1.4374	1.4440	1.4508	1.4577	1.4646	1.4717	45
16	3996	4056	4118	4181	4245	4309	4375	4441	4509	4578	4648	4718	44
17	3997	4058	4119	4182	4246	4310	4376	4443	4510	4579	4649	4720	43
18	3998	4059	4120	4183	4247	4311	4377	4444	4511	4580	4650	4721	42
19	3999	4060	4121	4184	4248	4313	4378	4445	4512	4581	4651	4722	41
20	1.4000	1.4061	1.4122	1.4185	1.4249	1.4314	1.4379	1.4446	1.4514	1.4582	1.4652	1.4723	40
21	4001	4062	4124	4186	4250	4315	4380	4447	4515	4584	4653	4724	39
22	4002	4063	4125	4187	4251	4316	4381	4448	4516	4585	4655	4726	38
23	4003	4064	4126	4188	4252	4317	4383	4449	4517	4586	4656	4727	37
24	4004	4065	4127	4189	4253	4318	4384	4450	4518	4587	4657	4728	36
25	1.4005	1.4066	1.4128	1.4191	1.4254	1.4319	1.4385	1.4452	1.4519	1.4588	1.4658	1.4729	35
26	4006	4067	4129	4192	4255	4320	4386	4453	4520	4589	4659	4730	34
27	4007	4068	4130	4193	4256	4321	4387	4454	4522	4590	4660	4732	33
28	4008	4069	4131	4194	4258	4322	4388	4455	4523	4592	4662	4733	32
29	4009	4070	4132	4195	4259	4323	4389	4456	4524	4593	4663	4734	31
30	1.4010	1.4071	1.4133	1.4196	1.4260	1.4325	1.4390	1.4457	1.4525	1.4594	1.4664	1.4735	30
31	4011	4072	4134	4197	4261	4326	4391	4458	4526	4595	4665	4736	29
32	4012	4073	4135	4198	4262	4327	4393	4459	4527	4596	4666	4737	28
33	4013	4074	4136	4199	4263	4328	4394	4460	4528	4597	4668	4739	27
34	4014	4075	4137	4200	4264	4329	4395	4462	4530	4599	4669	4740	26
35	1.4015	1.4076	1.4138	1.4201	1.4265	1.4330	1.4396	1.4463	1.4531	1.4600	1.4670	1.4741	25
36	4016	4077	4139	4202	4266	4331	4397	4464	4532	4601	4671	4742	24
37	4017	4078	4140	4203	4267	4332	4398	4465	4533	4602	4672	4744	23
38	4018	4079	4141	4204	4268	4333	4399	4466	4534	4603	4673	4745	22
39	4019	4080	4142	4205	4269	4334	4400	4467	4535	4604	4675	4746	21
40	1.4020	1.4081	1.4143	1.4206	1.4270	1.4335	1.4401	1.4468	1.4536	1.4606	1.4676	1.4747	20
41	4021	4082	4144	4207	4271	4336	4402	4469	4538	4607	4677	4748	19
42	4022	4083	4145	4209	4273	4338	4404	4471	4539	4608	4678	4750	18
43	4023	4084	4146	4210	4274	4339	4405	4472	4540	4609	4679	4751	17
44	4024	4085	4147	4211	4275	4340	4406	4473	4541	4610	4680	4752	16
45	1.4025	1.4086	1.4149	1.4212	1.4276	1.4341	1.4407	1.4474	1.4542	1.4611	1.4682	1.4753	15
46	4026	4087	4150	4213	4277	4342	4408	4475	4543	4612	4683	4754	14
47	4027	4088	4151	4214	4278	4343	4409	4476	4544	4614	4684	4756	13
48	4028	4089	4152	4215	4279	4344	4410	4477	4546	4615	4685	4757	12
49	4029	4090	4153	4216	4280	4345	4411	4479	4547	4616	4686	4758	11
50	1.4030	1.4091	1.4154	1.4217	1.4281	1.4346	1.4412	1.4480	1.4548	1.4617	1.4688	1.4759	10
51	4031	4092	4155	4218	4282	4347	4414	4481	4549	4618	4689	4760	9
52	4032	4093	4156	4219	4283	4349	4415	4482	4550	4619	4690	4762	8
53	4033	4095	4157	4220	4284	4350	4416	4483	4551	4621	4691	4763	7
54	4034	4096	4158	4221	4285	4351	4417	4484	4552	4622	4692	4764	6
55	1.4035	1.4097	1.4159	1.4222	1.4287	1.4352	1.4418	1.4485	1.4554	1.4623	1.4693	1.4765	5
56	4036	4098	4160	4223	4288	4353	4419	4486	4555	4624	4695	4766	4
57	4037	4099	4161	4224	4289	4354	4420	4488	4556	4625	4690	4768	3
58	4038	4100	4162	4226	4290	4355	4421	4489	4557	4626	4697	4769	2
59	4039	4101	4163	4227	4291	4356	4422	4490	4558	4628	4698	4770	1
60	4040	4102	4164	4228	4292	4357	4424	4491	4559	4629	4699	4771	0
	11′	10′	9′	8′	7′	6′	5′	4′	3′	2′	1′	0′	S.

6 DEGREES.

When the Apparent Distance is *less* than 90°, the Second Correction is to be taken from the Bottom.

TABLE XVII.

Logarithms of the First and Second Corrections.

The First Correction is *always* to be taken from the Top, and also the Second, when the Apparent Distance is *greater* than 90°.

4 DEGREES.

S.	0′	1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	
0	1.4771	1.4844	1.4918	1.4994	1.5071	1.5149	1.5229	1.5310	1.5393	1.5477	1.5563	1.5651	60
1	4772	4845	4920	4995	5072	5150	5230	5311	5394	5478	5564	5652	59
2	4774	4847	4921	4997	5073	5152	5231	5313	5395	5480	5566	5654	58
3	4775	4848	4922	4998	5075	5153	5233	5314	5397	5481	5567	5655	57
4	4776	4849	4923	4999	5076	5154	5234	5315	5398	5483	5569	5657	56
5	1.4777	1.4850	1.4925	1.5000	1.5077	1.5156	1.5235	1.5317	1.5400	1.5484	1.5570	1.5658	55
6	4778	4852	4926	5002	5079	5157	5237	5318	5401	5486	5572	5660	54
7	4780	4853	4927	5003	5080	5158	5238	5320	5402	5487	5573	5661	53
8	4781	4854	4928	5004	5081	5160	5240	5321	5404	5488	5575	5663	52
9	4782	4855	4930	5005	5082	5161	5241	5322	5405	5490	5576	5664	51
10	1.4783	1.4856	1.4931	1.5007	1.5084	1.5162	1.5242	1.5324	1.5407	1.5491	1.5578	1.5666	50
11	4785	4858	4932	5008	5085	5164	5244	5325	5408	5493	5579	5667	49
12	4786	4859	4933	5009	5086	5165	5245	5326	5409	5494	5580	5669	48
13	4787	4860	4935	5011	5088	5166	5246	5328	5411	5496	5582	5670	47
14	4788	4861	4936	5012	5089	5168	5248	5329	5412	5497	5583	5671	46
15	1.4789	1.4863	1.4937	1.5013	1.5090	1.5169	1.5249	1.5331	1.5414	1.5498	1.5585	1.5673	45
16	4791	4864	4938	5014	5092	5170	5250	5332	5415	5500	5586	5674	44
17	4792	4865	4940	5016	5093	5172	5252	5333	5416	5501	5588	5676	43
18	4793	4866	4941	5017	5094	5173	5253	5335	5418	5503	5589	5677	42
19	4794	4868	4942	5018	5095	5174	5254	5336	5419	5504	5591	5679	41
20	1.4795	1.4869	1.4943	1.5019	1.5097	1.5175	1.5256	1.5337	1.5421	1.5506	1.5592	1.5680	40
21	4797	4870	4945	5021	5098	5177	5257	5339	5422	5507	5594	5682	39
22	4798	4871	4946	5022	5099	5178	5258	5340	5423	5508	5595	5683	38
23	4799	4873	4947	5023	5101	5179	5260	5341	5425	5510	5596	5685	37
24	4800	4874	4949	5025	5102	5181	5261	5343	5426	5511	5598	5686	36
25	1.4801	1.4875	1.4950	1.5026	1.5103	1.5182	1.5262	1.5344	1.5428	1.5513	1.5599	1.5688	35
26	4803	4876	4951	5027	5105	5183	5264	5346	5429	5514	5601	5689	34
27	4804	4877	4952	5028	5106	5185	5265	5347	5430	5516	5602	5691	33
28	4805	4879	4954	5030	5107	5186	5266	5348	5432	5517	5604	5692	32
29	4806	4880	4955	5031	5108	5187	5268	5350	5433	5518	5605	5694	31
30	1.4808	1.4881	1.4956	1.5032	1.5110	1.5189	1.5269	1.5351	1.5435	1.5520	1.5607	1.5695	30
31	4809	4882	4957	5034	5111	5190	5271	5353	5436	5521	5608	5697	29
32	4810	4884	4959	5035	5112	5191	5272	5354	5437	5522	5610	5698	28
33	4811	4885	4960	5036	5114	5193	5273	5355	5439	5524	5611	5700	27
34	4812	4886	4961	5037	5115	5194	5275	5357	5440	5526	5613	5701	26
35	1.4814	1.4887	1.4962	1.5039	1.5116	1.5195	1.5276	1.5358	1.5442	1.5527	1.5614	1.5703	25
36	4815	4889	4964	5040	5118	5197	5277	5359	5443	5528	5615	5704	24
37	4816	4890	4965	5041	5119	5198	5279	5361	5445	5530	5617	5706	23
38	4817	4891	4966	5043	5120	5199	5280	5362	5446	5531	5618	5707	22
39	4819	4892	4967	5044	5122	5200	5281	5364	5447	5533	5620	5709	21
40	1.4820	1.4894	1.4969	1.5045	1.5123	1.5202	1.5283	1.5365	1.5449	1.5534	1.5621	1.5710	20
41	4821	4895	4970	5046	5124	5203	5284	5366	5450	5536	5623	5712	19
42	4822	4896	4971	5048	5125	5205	5285	5368	5452	5537	5624	5713	18
43	4823	4897	4972	5049	5127	5206	5287	5369	5453	5538	5626	5715	17
44	4825	4899	4974	5050	5128	5207	5288	5370	5454	5540	5627	5716	16
45	1.4826	1.4900	1.4975	1.5051	1.5129	1.5209	1.5290	1.5372	1.5456	1.5541	1.5629	1.5718	15
46	4827	4901	4976	5053	5131	5210	5291	5373	5457	5543	5630	5719	14
47	4828	4902	4977	5054	5132	5211	5292	5375	5459	5544	5632	5721	13
48	4830	4903	4979	5055	5133	5213	5294	5376	5460	5546	5633	5722	12
49	4831	4905	4980	5057	5135	5214	5295	5377	5461	5547	5635	5724	11
50	1.4832	1.4906	1.4981	1.5058	1.5136	1.5215	1.5296	1.5379	1.5463	1.5549	1.5636	1.5725	10
51	4833	4907	4983	5059	5137	5217	5298	5380	5464	5550	5637	5727	9
52	4834	4908	4984	5061	5139	5218	5299	5382	5466	5551	5639	5728	8
53	4836	4910	4985	5062	5140	5219	5300	5383	5467	5553	5640	5730	7
54	4837	4911	4986	5063	5141	5221	5302	5384	5469	5554	5642	5731	6
55	1.4838	1.4912	1.4988	1.5064	1.5143	1.5222	1.5303	1.5386	1.5470	1.5556	1.5643	1.5733	5
56	4839	4913	4989	5066	5144	5223	5305	5387	5471	5557	5645	5734	4
57	4841	4915	4990	5067	5145	5225	5306	5389	5473	5559	5646	5736	3
58	4842	4916	4991	5068	5146	5226	5307	5390	5474	5560	5648	5737	2
59	4843	4917	4992	5070	5148	5227	5309	5391	5476	5562	5649	5739	1
60	4844	4918	4994	5071	5149	5229	5310	5393	5477	5563	5651	5740	0
	59′	58′	57′	56′	55′	54′	53′	52′	51′	50′	49′	48′	S.

5 DEGREES.

When the Apparent Distance is *less* than 90°, the Second Correction is to be taken from the Bottom

TABLE XVII.

Logarithms of the First and Second Corrections.

The First Correction is *always* to be taken from the Top, and also the Second, when the Apparent Distance is *greater* than 90°.

4 DEGREES.

S.	12′	13′	14′	15′	16′	17′	18′	19′	20′	21′	22′	23′	
0	1.5740	1.5832	1.5925	1.6021	1.6118	1.6218	1.6320	1.6425	1.6532	1.6642	1.6755	1.6871	60
1	5742	5833	5927	6022	6120	6220	6322	6427	6534	6644	6757	6873	59
2	5743	5835	5928	6024	6121	6221	6324	6428	6536	6646	6759	6875	58
3	5745	5836	5930	6025	6123	6223	6325	6430	6538	6648	6761	6877	57
4	5746	5838	5931	6027	6125	6225	6327	6432	6539	6650	6763	6879	56
5	1.5748	1.5839	1.5933	1.6029	1.6126	1.6226	1.6329	1.6434	1.6541	1.6651	1.6764	1.6881	55
6	5749	5841	5935	6030	6128	6228	6331	6435	6543	6653	6766	6882	54
7	5751	5843	5936	6032	6130	6230	6332	6437	6545	6655	6768	6884	53
8	5752	5844	5938	6033	6131	6232	6334	6439	6547	6657	6770	6886	52
9	5754	5846	5939	6035	6133	6233	6336	6441	6548	6659	6772	6888	51
10	1.5755	1.5847	1.5941	1.6037	1.6135	1.6235	1.6338	1.6443	1.6550	1.6661	1.6774	1.6890	50
11	5757	5849	5942	6038	6136	6237	6339	6444	6552	6663	6776	6892	49
12	5758	5850	5944	6040	6138	6238	6341	6446	6554	6664	6778	6894	48
13	5760	5852	5946	6042	6140	6240	6343	6448	6556	6666	6780	6896	47
14	5761	5853	5947	6043	6141	6242	6344	6450	6558	6668	6782	6898	46
15	1.5763	1.5855	1.5949	1.6045	1.6143	1.6243	1.6346	1.6451	1.6559	1.6670	1.6784	1.6900	45
16	5765	5856	5950	6046	6145	6245	6348	6453	6561	6672	6785	6902	44
17	5766	5858	5952	6048	6146	6247	6350	6455	6563	6674	6787	6904	43
18	5768	5860	5954	6050	6148	6248	6351	6457	6565	6676	6789	6906	42
19	5769	5861	5955	6051	6150	6250	6353	6459	6567	6677	6791	6908	41
20	1.5771	1.5863	1.5957	1.6053	1.6151	1.6252	1.6355	1.6460	1.6568	1.6679	1.6793	1.6910	40
21	5772	5864	5958	6055	6153	6254	6357	6462	6570	6681	6795	6912	39
22	5774	5866	5960	6056	6155	6255	6358	6464	6572	6683	6797	6914	38
23	5775	5867	5961	6058	6156	6257	6360	6466	6574	6685	6799	6916	37
24	5777	5869	5963	6059	6158	6259	6362	6467	6576	6687	6801	6918	36
25	1.5778	1.5870	1.5965	1.6061	1.6160	1.6260	1.6364	1.6469	1.6578	1.6689	1.6803	1.6920	35
26	5780	5872	5966	6063	6161	6262	6365	6471	6579	6691	6805	6922	34
27	5781	5874	5968	6064	6163	6264	6367	6473	6581	6692	6807	6924	33
28	5783	5875	5969	6066	6165	6265	6369	6475	6583	6694	6809	6926	32
29	5784	5877	5971	6067	6166	6267	6371	6476	6585	6696	6810	6928	31
30	1.5786	1.5878	1.5973	1.6069	1.6168	1.6269	1.6372	1.6478	1.6587	1.6698	1.6812	1.6930	30
31	5787	5880	5974	6071	6169	6271	6374	6480	6589	6700	6814	6932	29
32	5789	5881	5976	6072	6171	6272	6376	6482	6590	6702	6816	6934	28
33	5790	5883	5977	6074	6173	6274	6377	6484	6592	6704	6818	6936	27
34	5792	5884	5979	6076	6174	6276	6379	6485	6594	6706	6820	6938	26
35	1.5793	1.5886	1.5981	1.6077	1.6176	1.6277	1.6381	1.6487	1.6596	1.6708	1.6822	1.6940	25
36	5795	5888	5982	6079	6178	6279	6383	6489	6598	6709	6824	6942	24
37	5796	5889	5984	6081	6179	6281	6384	6491	6600	6711	6826	6944	23
38	5798	5891	5985	6082	6181	6282	6386	6492	6601	6713	6828	6946	22
39	5800	5892	5987	6084	6183	6284	6388	6494	6603	6715	6830	6948	21
40	1.5801	1.5894	1.5989	1.6085	1.6185	1.6286	1.6390	1.6496	1.6605	1.6717	1.6832	1.6950	20
41	5803	5895	5990	6087	6186	6288	6391	6498	6607	6719	6834	6952	19
42	5804	5897	5992	6089	6188	6289	6393	6500	6609	6721	6836	6954	18
43	5806	5898	5993	6090	6190	6291	6395	6501	6611	6723	6838	6956	17
44	5807	5900	5995	6092	6191	6293	6397	6503	6612	6725	6840	6958	16
45	1.5809	1.5902	1.5997	1.6094	1.6193	1.6294	1.6398	1.6505	1.6614	1.6726	1.6841	1.6960	15
46	5810	5903	5998	6095	6195	6296	6400	6507	6616	6728	6843	6962	14
47	5812	5905	6000	6097	6196	6298	6402	6509	6618	6730	6845	6964	13
48	5813	5906	6001	6099	6198	6300	6404	6510	6620	6732	6847	6966	12
49	5815	5908	6003	6100	6200	6301	6406	6512	6622	6734	6849	6968	11
50	1.5816	1.5909	1.6005	1.6102	1.6201	1.6303	1.6407	1.6514	1.6624	1.6736	1.6851	1.6970	10
51	5818	5911	6006	6103	6203	6305	6409	6516	6625	6738	6853	6972	9
52	5819	5913	6008	6105	6205	6306	6411	6518	6627	6740	6855	6974	8
53	5821	5914	6009	6107	6206	6308	6413	6519	6629	6742	6857	6976	7
54	5823	5916	6011	6108	6208	6310	6414	6521	6631	6743	6859	6978	6
55	1.5824	1.5917	1.6013	1.6110	1.6210	1.6312	1.6416	1.6523	1.6633	1.6745	1.6861	1.6980	5
56	5826	5919	6014	6112	6211	6313	6418	6525	6635	6747	6863	6982	4
57	5827	5920	6016	6113	6213	6315	6420	6527	6637	6749	6865	6984	3
58	5829	5922	6017	6115	6215	6317	6421	6529	6638	6751	6867	6986	2
59	5830	5924	6019	6117	6216	6319	6423	6530	6640	6753	6869	6988	1
60	5832	5925	6021	6118	6218	6320	6425	6532	6642	6755	6871	6990	0
	47′	46′	45′	44′	43′	42′	41′	40′	39′	38′	37′	36′	S.

5 DEGREES.

When the Apparent Distance is *less* than 90°, the Second Correction is to be taken from the Bottom

TABLE XVII.

Logarithms of the First and Second Corrections.

The First Correction is *always* to be taken from the Top, and also the Second, when the Apparent Distance is *greater* than 90°.

4 DEGREES.

S.	24′	25′	26′	27′	28′	29′	30′	31′	32′	33′	34′	35′	
0	1.6990	1.7112	1.7238	1.7368	1.7501	1.7639	1.7782	1.7929	1.8081	1.8239	1.8403	1.8573	60
1	6992	7114	7240	7370	7503	7641	7784	7931	8084	8242	8406	8576	59
2	6994	7116	7242	7372	7506	7644	7786	7934	8086	8244	8409	8579	58
3	6996	7118	7244	7374	7508	7646	7789	7936	8089	8247	8411	8582	57
4	6998	7120	7246	7376	7510	7648	7791	7939	8091	8250	8414	8585	56
5	1.7000	1.7122	1.7249	1.7379	1.7513	1.7651	1.7794	1.7941	1.8094	1.8253	1.8417	1.8588	55
6	7002	7124	7251	7381	7515	7653	7796	7944	8097	8255	8420	8591	54
7	7004	7127	7253	7383	7517	7655	7798	7946	8099	8258	8423	8594	53
8	7006	7129	7255	7385	7519	7658	7801	7949	8102	8261	8425	8597	52
9	7008	7131	7257	7387	7522	7660	7803	7951	8104	8263	8428	8599	51
10	1.7010	1.7133	1.7259	1.7390	1.7524	1.7663	1.7806	1.7954	1.8107	1.8266	1.8431	1.8602	50
11	7012	7135	7261	7392	7526	7665	7808	7956	8110	8269	8434	8605	49
12	7014	7137	7264	7394	7528	7667	7811	7959	8112	8271	8437	8608	48
13	7016	7139	7266	7396	7531	7670	7813	7961	8115	8274	8439	8611	47
14	7018	7141	7268	7398	7533	7672	7815	7964	8117	8277	8442	8614	46
15	1.7020	1.7143	1.7270	1.7401	1.7535	1.7674	1.7818	1.7966	1.8120	1.8279	1.8445	1.8617	45
16	7022	7145	7272	7403	7538	7677	7820	7969	8123	8282	8448	8620	44
17	7024	7147	7274	7405	7540	7679	7823	7971	8125	8285	8451	8623	43
18	7026	7149	7276	7407	7542	7681	7825	7974	8128	8288	8453	8626	42
19	7028	7152	7279	7409	7544	7684	7828	7976	8131	8290	8456	8629	41
20	1.7030	1.7154	1.7281	1.7412	1.7547	1.7686	1.7830	1.7979	1.8133	1.8293	1.8459	1.8632	40
21	7032	7156	7283	7414	7549	7688	7832	7981	8136	8296	8462	8635	39
22	7034	7158	7285	7416	7551	7691	7835	7984	8138	8298	8465	8637	38
23	7036	7160	7287	7418	7554	7693	7837	7987	8141	8301	8467	8640	37
24	7038	7162	7289	7421	7556	7696	7840	7989	8144	8304	8470	8643	36
25	1.7040	1.7164	1.7291	1.7423	1.7558	1.7698	1.7842	1.7992	1.8146	1.8307	1.8473	1.8646	35
26	7042	7166	7294	7425	7560	7700	7845	7994	8149	8309	8476	8649	34
27	7044	7168	7296	7427	7563	7703	7847	7997	8152	8312	8479	8652	33
28	7046	7170	7298	7429	7565	7705	7850	7999	8154	8315	8482	8655	32
29	7048	7172	7300	7432	7567	7707	7852	8002	8157	8318	8484	8658	31
30	1.7050	1.7175	1.7302	1.7434	1.7570	1.7710	1.7855	1.8004	1.8159	1.8320	1.8487	1.8661	30
31	7052	7177	7304	7436	7572	7712	7857	8007	8162	8323	8490	8664	29
32	7055	7179	7307	7438	7574	7714	7859	8009	8165	8326	8493	8667	28
33	7057	7181	7309	7441	7576	7717	7862	8012	8167	8328	8496	8670	27
34	7059	7183	7311	7443	7579	7719	7864	8014	8170	8331	8499	8673	26
35	1.7061	1.7185	1.7313	1.7445	1.7581	1.7722	1.7867	1.8017	1.8173	1.8334	1.8502	1.8676	25
36	7063	7187	7315	7447	7583	7724	7869	8020	8175	8337	8504	8679	24
37	7065	7189	7317	7450	7586	7726	7872	8022	8178	8339	8507	8682	23
38	7067	7191	7320	7452	7588	7729	7874	8025	8181	8342	8510	8685	22
39	7069	7193	7322	7454	7590	7731	7877	8027	8183	8345	8513	8688	21
40	1.7071	1.7196	1.7324	1.7456	1.7593	1.7734	1.7879	1.8030	1.8186	1.8348	1.8516	1.8691	20
41	7073	7198	7326	7458	7595	7736	7882	8032	8188	8350	8519	8694	19
42	7075	7200	7328	7461	7597	7738	7884	8035	8191	8353	8522	8697	18
43	7077	7202	7330	7463	7600	7741	7887	8037	8194	8356	8524	8700	17
44	7079	7204	7333	7465	7602	7743	7889	8040	8196	8359	8527	8703	16
45	1.7081	1.7206	1.7335	1.7467	1.7604	1.7745	1.7891	1.8043	1.8199	1.8361	1.8530	1.8706	15
46	7083	7208	7337	7470	7607	7748	7894	8045	8202	8364	8533	8709	14
47	7085	7210	7339	7472	7609	7750	7896	8048	8204	8367	8536	8712	13
48	7087	7212	7341	7474	7611	7753	7899	8050	8207	8370	8539	8715	12
49	7089	7215	7344	7476	7613	7755	7901	8053	8210	8372	8542	8718	11
50	1.7091	1.7217	1.7346	1.7479	1.7616	1.7758	1.7904	1.8055	1.8212	1.8375	1.8544	1.8721	10
51	7093	7219	7348	7481	7618	7760	7906	8058	8215	8378	8547	8724	9
52	7096	7221	7350	7483	7620	7762	7909	8061	8218	8381	8550	8727	8
53	7098	7223	7352	7485	7623	7765	7911	8063	8220	8384	8553	8730	7
54	7100	7225	7354	7488	7625	7767	7914	8066	8223	8386	8556	8733	6
55	1.7102	1.7227	1.7357	1.7490	1.7627	1.7769	1.7916	1.8068	1.8226	1.8389	1.8559	1.8736	5
56	7104	7229	7359	7492	7630	7772	7919	8071	8228	8392	8562	8739	4
57	7106	7232	7361	7494	7632	7774	7921	8073	8231	8395	8565	8742	3
58	7108	7234	7363	7497	7634	7777	7924	8076	8234	8397	8568	8745	2
59	7110	7236	7365	7499	7637	7779	7926	8079	8236	8400	8570	8748	1
60	7112	7238	7368	7501	7639	7782	7929	8081	8239	8403	8573	8751	0
	35′	34′	33′	32′	31′	30′	29′	28′	27′	26′	25′	24′	S.

5 DEGREES.

When the Apparent Distance is *less* than 90°, the Second Correction is to be taken from the Bottom.

TABLE XVII.

Logarithms of the First and Second Corrections.

The First Correction is *always* to be taken from the Top, and also the Second, when the Apparent Distance is *greater* than 90°.

4 DEGREES.

S.	36′	37′	38′	39′	40′	41′	42′	43′	44′	45′	46′	47′	
0	1.8751	1.8935	1.9128	1.9331	1.9542	1.9765	2.0000	2.0248	2.0512	2.0792	2.1091	2.1413	60
1	8754	8939	9132	9334	9546	9769	0004	0252	0516	0797	1097	1419	59
2	8757	8942	9135	9337	9550	9773	0008	0257	0521	0801	1102	1424	58
3	8760	8945	9138	9341	9553	9777	0012	0261	0525	0806	1107	1430	57
4	8763	8948	9142	9344	9557	9780	0016	0265	0530	0811	1112	1436	56
5	1.8766	1.8951	1.9145	1.9348	1.9561	1.9784	2.0020	2.0270	2.0534	2.0816	2.1117	2.1441	55
6	8769	8954	9148	9351	9564	9788	0024	0274	0539	0821	1123	1447	54
7	8772	8958	9152	9355	9568	9792	0028	0278	0543	0826	1128	1452	53
8	8775	8961	9155	9358	9571	9796	0032	0282	0548	0831	1133	1458	52
9	8778	8964	9158	9362	9575	9800	0036	0287	0552	0835	1138	1464	51
10	1.8781	1.8967	1.9162	1.9365	1.9579	1.9803	2.0040	2.0291	2.0557	2.0840	2.1143	2.1469	50
11	8784	8970	9165	9369	9582	9807	0044	0295	0562	0845	1149	1475	49
12	8787	8973	9168	9372	9586	9811	0049	0300	0566	0850	1154	1481	48
13	8790	8977	9172	9376	9590	9815	0053	0304	0571	0855	1159	1486	47
14	8793	8980	9175	9379	9593	9819	0057	0308	0575	0860	1164	1492	46
15	1.8796	1.8983	1.9178	1.9383	1.9597	1.9823	2.0061	2.0313	2.0580	2.0865	2.1170	2.1498	45
16	8799	8986	9181	9386	9601	9827	0065	0317	0585	0870	1175	1503	44
17	8802	8989	9185	9390	9604	9830	0069	0321	0589	0875	1180	1509	43
18	8805	8992	9188	9393	9608	9834	0073	0326	0594	0880	1186	1515	42
19	8808	8996	9191	9397	9612	9838	0077	0330	0598	0884	1191	1520	41
20	1.8811	1.8999	1.9195	1.9400	1.9615	1.9842	2.0081	2.0334	2.0603	2.0889	2.1196	2.1526	40
21	8814	9002	9198	9404	9619	9846	0085	0339	0608	0894	1201	1532	39
22	8817	9005	9201	9407	9623	9850	0089	0343	0612	0899	1207	1538	38
23	8821	9008	9205	9411	9626	9854	0093	0347	0617	0904	1212	1543	37
24	8824	9012	9208	9414	9630	9858	0098	0352	0621	0909	1217	1549	36
25	1.8827	1.9015	1.9212	1.9418	1.9634	1.9861	2.0102	2.0356	2.0626	2.0914	2.1223	2.1555	35
26	8830	9018	9215	9421	9638	9865	0106	0360	0631	0919	1228	1561	34
27	8833	9021	9218	9425	9641	9869	0110	0365	0635	0924	1233	1566	33
28	8836	9024	9222	9428	9645	9873	0114	0369	0640	0929	1239	1572	32
29	8839	9028	9225	9432	9649	9877	0118	0374	0645	0934	1244	1578	31
30	1.8842	1.9031	1.9228	1.9435	1.9652	1.9881	2.0122	2.0378	2.0649	2.0939	2.1249	2.1584	30
31	8845	9034	9232	9439	9656	9885	0126	0382	0654	0944	1255	1589	29
32	8848	9037	9235	9442	9660	9889	0131	0387	0659	0949	1260	1595	28
33	8851	9041	9238	9446	9664	9893	0135	0391	0663	0954	1266	1601	27
34	8854	9044	9242	9449	9667	9897	0139	0395	0668	0959	1271	1607	26
35	1.8857	1.9047	1.9245	1.9453	1.9671	1.9901	2.0143	2.0400	2.0673	2.0964	2.1276	2.1613	25
36	8861	9050	9249	9456	9675	9905	0147	0404	0678	0969	1282	1619	24
37	8864	9053	9252	9460	9678	9908	0151	0409	0682	0974	1287	1624	23
38	8867	9057	9255	9464	9682	9912	0156	0413	0687	0979	1292	1630	22
39	8870	9060	9259	9467	9686	9916	0160	0418	0692	0984	1298	1636	21
40	1.8873	1.9063	1.9262	1.9471	1.9690	1.9920	2.0164	2.0422	2.0696	2.0989	2.1303	2.1642	20
41	8876	9066	9266	9474	9693	9924	0168	0426	0701	0994	1309	1648	19
42	8879	9070	9269	9478	9697	9928	0172	0431	0706	0999	1314	1654	18
43	8882	9073	9272	9481	9701	9932	0176	0435	0711	1004	1320	1660	17
44	8885	9076	9276	9485	9705	9936	0181	0440	0715	1009	1325	1665	16
45	1.8888	1.9079	1.9279	1.9488	1.9708	1.9940	2.0185	2.0444	2.0720	2.1015	2.1331	2.1671	15
46	8892	9083	9283	9492	9712	9944	0189	0449	0725	1020	1336	1677	14
47	8895	9086	9286	9496	9716	9948	0193	0453	0730	1025	1342	1683	13
48	8898	9089	9289	9499	9720	9952	0197	0458	0734	1030	1347	1689	12
49	8901	9092	9293	9503	9723	9956	0202	0462	0739	1035	1352	1695	11
50	1.8904	1.9096	1.9296	1.9506	1.9727	1.9960	2.0206	2.0467	2.0744	2.1040	2.1358	2.1701	10
51	8907	9099	9300	9510	9731	9964	0210	0471	0749	1045	1363	1707	9
52	8910	9102	9303	9514	9735	9968	0214	0475	0753	1050	1369	1713	8
53	8913	9106	9306	9517	9739	9972	0219	0480	0758	1055	1374	1719	7
54	8917	9109	9310	9521	9742	9976	0223	0484	0763	1061	1380	1725	6
55	1.8920	1.9112	1.9313	1.9524	1.9746	1.9980	2.0227	2.0489	2.0768	2.1066	2.1386	2.1731	5
56	8923	9115	9317	9528	9750	9984	0231	0493	0773	1071	1391	1737	4
57	8926	9119	9320	9532	9754	9988	0235	0498	0777	1076	1397	1743	3
58	8929	9122	9324	9535	9758	9992	0240	0502	0782	1081	1402	1749	2
59	8932	9125	9327	9539	9761	9996	0244	0507	0787	1086	1408	1755	1
60	8935	9128	9331	9542	9765	2.0000	0248	0512	0792	1091	1413	1761	0
	23′	22′	21′	20′	19′	18′	17′	16′	15′	14′	13′	12′	S.

5 DEGREES.

When the Apparent Distance is *less* than 90°, the Second Correction is to be taken from the Bottom.

TABLE XVII.

Logarithms of the First and Second Corrections.

The First Correction is *always* to be taken from the Top, and also the Second, when the Apparent Distance is *greater* than 90°.

4 DEGREES.

S.	48′	49′	50′	51′	52′	53′	54′	55′	56′	57′	58′	59′	
0	2.1761	2.2139	2.2553	2.3010	2.3522	2.4102	2.4771	2.5563	2.6532	2.7782	2.9542	3.2553	60
1	1767	2145	2560	3018	3531	4112	4783	5578	6550	7806	9579	2626	59
2	1773	2152	2567	3026	3540	4122	4795	5592	6568	7830	9615	2700	58
3	1779	2159	2574	3034	3549	4133	4808	5607	6587	7855	9652	2775	57
4	1785	2165	2582	3043	3558	4143	4820	5621	6605	7879	9690	2852	56
5	2.1791	2.2172	2.2589	2.3051	2.3567	2.4154	2.4832	2.5636	2.6624	2.7904	2.9727	3.2931	55
6	1797	2178	2596	3059	3576	4164	4844	5651	6642	7929	9765	3010	54
7	1803	2185	2604	3067	3586	4175	4856	5666	6661	7954	9803	3091	53
8	1809	2192	2611	3075	3595	4185	4869	5680	6679	7979	9842	3174	52
9	1816	2198	2618	3083	3604	4196	4881	5695	6698	8004	9881	3259	51
10	2.1822	2.2205	2.2626	2.3091	2.3613	2.4206	2.4894	2.5710	2.6717	2.8030	2.9920	3.3345	50
11	1828	2212	2633	3100	3623	4217	4906	5725	6736	8055	9960	3432	49
12	1834	2218	2640	3108	3632	4228	4918	5740	6755	8081	3.0000	3522	48
13	1840	2225	2648	3116	3641	4238	4931	5755	6774	8107	0040	3613	47
14	1846	2232	2655	3124	3650	4249	4943	5771	6793	8133	0081	3707	46
15	2.1852	2.2239	2.2663	2.3133	2.3660	2.4260	2.4956	2.5786	2.6812	2.8159	3.0122	3.3802	45
16	1859	2245	2670	3141	3669	4270	4969	5801	6832	8186	0164	3900	44
17	1865	2252	2678	3149	3678	4281	4981	5816	6851	8212	0206	4000	43
18	1871	2259	2685	3158	3688	4292	4994	5832	6871	8239	0248	4102	42
19	1877	2266	2692	3166	3697	4303	5007	5847	6890	8266	0291	4206	41
20	2.1883	2.2272	2.2700	2.3174	2.3707	2.4314	2.5019	2.5863	2.6910	2.8293	3.0334	3.4314	40
21	1889	2279	2707	3183	3716	4325	5032	5878	6930	8320	0378	4424	39
22	1896	2286	2715	3191	3726	4335	5045	5894	6950	8348	0422	4536	38
23	1902	2293	2722	3199	3735	4346	5058	5909	6970	8375	0467	4652	37
24	1908	2300	2730	3208	3745	4357	5071	5925	6990	8403	0512	4771	36
25	2.1914	2.2307	2.2738	2.3216	2.3754	2.4368	2.5084	2.5941	2.7010	2.8431	3.0557	3.4894	35
26	1921	2313	2745	3225	3764	4379	5097	5957	7030	8459	0603	5019	34
27	1927	2320	2753	3233	3773	4390	5110	5973	7050	8487	0649	5149	33
28	1933	2327	2760	3242	3783	4401	5123	5989	7071	8516	0696	5283	32
29	1939	2334	2768	3250	3792	4412	5136	6005	7091	8544	0744	5421	31
30	2.1946	2.2341	2.2775	2.3259	2.3802	2.4424	2.5149	2.6021	2.7112	2.8573	3.0792	3.5563	30
31	1952	2348	2783	3267	3812	4435	5162	6037	7133	8602	0840	5710	29
32	1958	2355	2791	3276	3821	4446	5175	6053	7154	8632	0889	5863	28
33	1965	2362	2798	3284	3831	4457	5189	6069	7175	8661	0939	6021	27
34	1971	2368	2806	3293	3841	4468	5202	6085	7196	8691	0989	6185	26
35	2.1977	2.2375	2.2814	2.3301	2.3851	2.4480	2.5215	2.6102	2.7217	2.8721	3.1040	3.6355	25
36	1984	2382	2821	3310	3860	4491	5229	6118	7238	8751	1091	6532	24
37	1990	2389	2829	3319	3870	4502	5242	6135	7259	8781	1143	6717	23
38	1996	2396	2837	3327	3880	4514	5256	6151	7281	8811	1196	6910	22
39	2003	2403	2845	3336	3890	4525	5269	6168	7302	8842	1249	7112	21
40	2.2009	2.2410	2.2852	2.3345	2.3900	2.4536	2.5283	2.6185	2.7324	2.8873	3.1303	3.7324	20
41	2016	2417	2860	3353	3910	4548	5296	6201	7346	8904	1358	7547	19
42	2022	2424	2868	3362	3919	4559	5310	6218	7368	8935	1413	7782	18
43	2028	2431	2876	3371	3929	4571	5324	6235	7390	8967	1469	8030	17
44	2035	2438	2883	3379	3939	4582	5337	6252	7412	8999	1526	8293	16
45	2.2041	2.2445	2.2891	2.3388	2.3949	2.4594	2.5351	2.6269	2.7434	2.9031	3.1584	3.8573	15
46	2048	2453	2899	3397	3959	4606	5365	6286	7456	9063	1642	8873	14
47	2054	2460	2907	3406	3969	4617	5379	6303	7479	9096	1701	9195	13
48	2061	2467	2915	3415	3979	4629	5393	6320	7501	9128	1761	9542	12
49	2067	2474	2923	3423	3989	4640	5407	6338	7524	9162	1822	9920	11
50	2.2073	2.2481	2.2931	2.3432	2.4000	2.4652	2.5421	2.6355	2.7547	2.9195	3.1883	4.0334	10
51	2080	2488	2939	3441	4010	4664	5435	6372	7570	9228	1946	0792	9
52	2086	2495	2946	3450	4020	4676	5449	6390	7593	9262	2009	1303	8
53	2093	2502	2954	3459	4030	4688	5463	6407	7616	9296	2073	1883	7
54	2099	2510	2962	3468	4040	4699	5477	6425	7639	9331	2139	2553	6
55	2.2106	2.2517	2.2970	2.3477	2.4050	2.4711	2.5491	2.6443	2.7663	2.9365	3.2205	4.3345	5
56	2113	2524	2978	3486	4061	4723	5506	6460	7686	9400	2272	4314	4
57	2119	2531	2986	3495	4071	4735	5520	6478	7710	9435	2341	5563	3
58	2126	2538	2994	3504	4081	4747	5534	6496	7734	9471	2410	7324	2
59	2132	2545	3002	3513	4091	4759	5549	6514	7757	9506	2481	5.0334	1
60	2139	2553	3010	3522	4102	4771	5563	6532	7782	9542	2553		0
	11′	10′	9′	8′	7′	6′	5′	4′	3′	2′	1′	0′	S.

5 DEGREES.

When the Apparent Distance is *less* than 90°, the Second Correction is to be taken from the Bottom.

Third Correction, to Apparent Distance 20°

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR A STAR.																				☽'s App Alt.
	6°		7°		8°		9°		10°		11°		12°		14°		16°		18°		
°	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	°
6	1	38	1	42	1	46	1	55	2	7	2	19	2	34	3	9	3	43	4	17	6
7	1	46	1	37	1	40	1	46	1	53	2	3	2	12	2	36	3	1	3	29	7
8	1	55	1	43	1	36	1	40	1	44	1	49	1	56	2	14	2	35	2	56	8
9	2	8	1	51	1	40	1	36	1	39	1	42	1	45	1	57	2	12	2	29	9
10	2	23	2	0	1	46	1	40	1	36	1	37	1	39	1	46	1	56	2	10	10
11	2	38	2	11	1	54	1	45	1	38	1	35	1	37	1	40	1	46	1	56	11
12	2	53	2	23	2	3	1	51	1	41	1	37	1	35	1	37	1	41	1	47	12
13	3	9	2	35	2	13	1	57	1	46	1	40	1	37	1	35	1	37	1	41	13
14	3	25	2	47	2	23	2	3	1	52	1	44	1	39	1	33	1	34	1	37	14
15	3	41	3	0	2	34	2	11	1	58	1	49	1	42	1	35	1	33	1	35	15
16	3	58	3	13	2	45	2	20	2	4	1	54	1	46	1	36	1	32	1	33	16
17	4	15	3	26	2	56	2	29	2	10	1	59	1	50	1	38	1	33	1	31	17
18	4	32	3	40	3	7	2	38	2	17	2	4	1	54	1	40	1	34	1	30	18
19	4	49	3	53	3	18	2	47	2	24	2	9	1	58	1	43	1	35	1	31	19
20	5	5	4	6	3	28	2	56	2	31	2	15	2	2	1	46	1	37	1	31	20
21	5	21	4	19	3	39	3	4	2	38	2	20	2	6	1	49	1	39	1	32	21
22	5	36	4	32	3	49	3	12	2	46	2	26	2	11	1	53	1	40	1	33	22
23	5	51	4	44	3	59	3	20	2	53	2	32	2	16	1	57	1	42	1	34	23
24	6	5	4	56	4	9	3	28	3	0	2	38	2	22	2	0	1	43	1	35	24
25	6	19	5	7	4	18	3	36	3	7	2	44	2	26	2	3	1	45	1	36	25
26	6	32	5	18	4	27	3	44	3	14	2	49	2	31	2	6	1	47	1	37	26
27	6	45	5	29	4	35	3	52	3	20	2	54	2	35	2	8	1	49	1	38	27
28			5	39	4	42	3	59	3	26	2	59	2	38	2	11	1	50	1	39	28
29					4	49	4	6	3	32	3	4	2	41	2	13	1	52	1	40	29
30							4	12	3	37	3	8	2	45	2	15	1	54	1	41	30
31									3	42	3	12	2	49	2	16	1	56	1	42	31
32											3	16	2	52	2	18	1	58	1	43	32
33													2	55	2	20	1	59	1	43	33
34															2	21	1	59	1	43	34
35															2	22	1	59	1	43	35
36																	1	59	1	42	36
37																	1	59	1	42	37
38																			1	41	38
39																			1	41	39
40																					40
41																					41
42																					42
43																					43
44																					44
46																					46
48																					48
50																					50
52																					52
54																					54
56																					56
58																					58
60																					60
62																					62
64																					64
66																					66
68																					68
70																					70
72																					72
74																					74
76																					76
78																					78
80																					80
82																					82
84																					84
86																					86
	6°		7°		8°		9°		10°		11°		12°		14°		16°		18°		

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR A STAR.																				☽'s App Alt.
	20°		22°		24°		26°		28°		30°										
°	′	″	′	″	′	″	′	″	′	″	′	″									°
6	4	51	5	25	5	59	6	32													6
7	3	57	4	24	4	50	5	16													7
8	3	17	3	39	4	0	4	21	4	42											8
9	2	47	3	5	3	23	3	41	3	58											9
10	2	24	2	38	2	53	3	8	3	23	3	37									10
11	2	8	2	20	2	32	2	44	2	56	3	7									11
12	1	56	2	6	2	16	2	26	2	35	2	44									12
13	1	48	1	56	2	4	2	12	2	19	2	26									13
14	1	42	1	48	1	54	2	0	2	5	2	11									14
15	1	38	1	41	1	45	1	50	1	54	1	59									15
16	1	34	1	36	1	38	1	42	1	46	1	50									16
17	1	32	1	33	1	34	1	36	1	39	1	42									17
18	1	30	1	30	1	31	1	32	1	34	1	36									18
19	1	29	1	29	1	29	1	30	1	32	1	33									19
20	1	28	1	28	1	28	1	29	1	30	1	30									20
21	1	29	1	27	1	27	1	27	1	27	1	27									21
22	1	29	1	26	1	25	1	25	1	25	1	25									22
23	1	29	1	26	1	25	1	24	1	24	1	23									23
24	1	30	1	26	1	24	1	24	1	23	1	22									24
25	1	30	1	26	1	24	1	23	1	21	1	20									25
26	1	31	1	27	1	25	1	23	1	21	1	19									26
27	1	32	1	28	1	25	1	23	1	21	1	19									27
28	1	33	1	28	1	25	1	23	1	21	1	19									28
29	1	33	1	28	1	25	1	23	1	21	1	19									29
30	1	34	1	28	1	25	1	23	1	21	1	19									30
31	1	34	1	28	1	25	1	22	1	20	1	18									31
32	1	34	1	28	1	24	1	21	1	19	1	18									32
33	1	33	1	27	1	24	1	21	1	19	1	17									33
34	1	33	1	26	1	23	1	20	1	18	1	16									34
35	1	32	1	25	1	22	1	19	1	17	1	15									35
36	1	31	1	24	1	20	1	17	1	15	1	14									36
37	1	30	1	23	1	19	1	16	1	14	1	13									37
38	1	29	1	22	1	18	1	15	1	13	1	12									38
39	1	28	1	21	1	17	1	13	1	11	1	11									39
40	1	27	1	20	1	15	1	12	1	10	1	10									40
41	1	26	1	18	1	13	1	10	1	9	1	8									41
42			1	17	1	11	1	8	1	7	1	7									42
43			1	16	1	10	1	6	1	5	1	5									43
44					1	9	1	4	1	3	1	3									44
46					1	7	1	2	1	0	1	0									46
48								59		56		56									48
50										52		50									50
52												45									52
54																					54
56																					56
58																					58
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74																					74
76																					76
78																					78
80																					80
82																					82
84																					84
86																					86
	20°		22°		24°		26°		28°		30°										

TABLE XVIII.

Third Correction, to Apparent Distance 20°.

D's App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.															D's App Alt.
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6																	6
7																	7
8																	8
9																	9
10																	10
11	3 16																11
12	2 52																12
13	2 32	2 38															13
14	2 16	2 21															14
15	2 3	2 7	2 13														15
16	1 53	1 56	1 59														16
17	1 44	1 46	1 48	1 51													17
18	1 37	1 39	1 40	1 41													18
19	1 33	1 34	1 34	1 34													19
20	1 30	1 30	1 29	1 28	1 26												20
21	1 27	1 26	1 25	1 23	1 21												21
22	1 24	1 23	1 22	1 20	1 18												22
23	1 22	1 21	1 20	1 18	1 15												23
24	1 21	1 20	1 18	1 16	1 12	1 8											24
25	1 19	1 18	1 16	1 14	1 9	1 4											25
26	1 17	1 16	1 14	1 12	1 7	1 1											26
27	1 17	1 15	1 13	1 11	1 6	1 0											27
28	1 17	1 15	1 13	1 10	1 4	57	50										28
29	1 17	1 16	1 14	1 11	1 5	58	50										29
30	1 18	1 17	1 15	1 12	1 7	59	50										30
31	1 17	1 16	1 15	1 12	1 7	59	51										31
32	1 17	1 16	1 14	1 12	1 7	59	51	42									32
33	1 16	1 15	1 13	1 12	1 8	1 1	52	43									33
34	1 15	1 14	1 13	1 11	1 8	1 1	53	43									34
35	1 14	1 13	1 12	1 11	1 8	1 1	53	44									35
36	1 13	1 12	1 11	1 10	1 7	1 1	54	45	36								36
37	1 12	1 11	1 10	1 9	1 6	1 1	54	46	37								37
38	1 11	1 10	1 9	1 8	1 6	1 1	55	47	38								38
39	1 10	1 10	1 9	1 8	1 5	1 1	55	47	39								39
40	1 9	1 9	1 8	1 6	1 4	1 0	55	48	39	32							40
41	1 8	1 8	1 7	1 5	1 3	1 0	55	48	39	32							41
42	1 7	1 7	1 6	1 4	1 2	59	55	48	40	33							42
43	1 5	1 5	1 5	1 4	1 2	59	55	48	40	33							43
44	1 4	1 4	1 4	1 3	1 1	59	55	48	40	34	29						44
46	1 1	1 2	1 2	1 1	1 0	58	54	48	41	35	30						46
48	56	58	59	59	58	56	53	49	43	37	31	25					48
50	52	54	55	56	55	54	51	48	43	38	33	27					50
52	48	49	50	51	51	51	49	47	43	39	35	29	24				52
54	44	43	45	46	47	48	47	45	43	40	36	30	25				54
56		38	40	42	44	45	45	44	42	40	35	31	27	22			56
58			35	38	40	42	43	42	40	38	34	31	27	23			58
60				34	36	39	41	41	39	36	33	29	26	23	21		60
62					33	36	38	39	38	35	32	29	26	24	22		62
64					30	33	35	37	37	35	32	29	27	25	22		64
66						30	32	35	36	34	31	29	27	25	23	21	66
68						27	29	32	34	32	30	28	26	25	23	21	68
70							27	30	32	31	29	27	26	24	22	20	70
72							25	27	29	29	28	27	25	23	21	20	72
74								25	27	27	27	26	24	22	21	20	74
76								23	25	26	26	25	24	22	20	19	76
78									23	24	25	24	23	21	20		78
80									21	23	24	23	22	21	20		80
82										22	23	22	21	21			82
84										21	22	21	21				84
86											21	20	20				86
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°	

TABLE XVIII.

Third Correction, to Apparent Distance 24°.

D's App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																								D's App Alt.
	6°		7°		8°		9°		10°		11°		12°		14°		16°		18°		20°		22°		24°		26°		28°		30°		
°	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	°
6	1	28	1	31	1	35	1	42	1	52	2	3	2	16	2	46	3	16	3	47	4	19	4	50	5	20	5	50	6	20	6	50	6
7	1	35	1	27	1	30	1	34	1	39	1	46	1	54	2	15	2	38	3	3	3	29	3	55	4	20	4	46	5	10	5	34	7
8	1	45	1	32	1	26	1	28	1	30	1	35	1	41	1	58	2	17	2	37	2	58	3	18	3	39	4	1	4	20	4	39	8
9	1	56	1	39	1	30	1	25	1	26	1	29	1	34	1	44	1	59	2	15	2	31	2	48	3	6	3	24	3	40	3	56	9
10	2	8	1	48	1	36	1	29	1	25	1	26	1	28	1	35	1	45	1	57	2	13	2	27	2	43	2	58	3	12	3	26	10
11	2	21	1	58	1	43	1	34	1	28	1	24	1	26	1	30	1	36	1	46	1	58	2	11	2	24	2	37	2	49	3	0	11
12	2	36	2	9	1	52	1	41	1	33	1	27	1	24	1	26	1	30	1	37	1	47	1	58	2	9	2	20	2	29	2	38	12
13	2	51	2	20	2	1	1	48	1	38	1	31	1	27	1	24	1	27	1	32	1	40	1	48	1	57	2	6	2	14	2	22	13
14	3	6	2	31	2	10	1	55	1	43	1	35	1	30	1	23	1	25	1	28	1	33	1	40	1	48	1	55	2	2	2	10	14
15	3	21	2	42	2	20	2	2	1	50	1	39	1	33	1	24	1	23	1	25	1	24	1	34	1	40	1	46	1	52	1	59	15
16	3	36	2	54	2	30	2	9	1	56	1	44	1	36	1	26	1	22	1	23	1	25	1	29	1	33	1	38	1	44	1	50	16
17	3	51	3	6	2	40	2	17	2	2	1	49	1	39	1	28	1	23	1	21	1	23	1	26	1	29	1	34	1	39	1	43	17
18	4	6	3	18	2	49	2	25	2	8	1	54	1	43	1	31	1	24	1	20	1	21	1	23	1	26	1	30	1	34	1	37	18
19	4	21	3	30	2	59	2	33	2	14	1	59	1	47	1	33	1	25	1	21	1	20	1	22	1	24	1	27	1	30	1	32	19
20	4	35	3	42	3	9	2	41	2	21	2	5	1	52	1	36	1	27	1	22	1	19	1	20	1	22	1	24	1	26	1	28	20
21	4	50	3	54	3	19	2	50	2	28	2	11	1	56	1	39	1	29	1	23	1	20	1	19	1	20	1	21	1	23	1	25	21
22	5	4	4	6	3	28	2	58	2	35	2	17	2	1	1	42	1	31	1	24	1	20	1	18	1	19	1	19	1	20	1	22	22
23	5	19	4	18	3	38	3	6	2	43	2	23	2	6	1	46	1	33	1	25	1	21	1	18	1	18	1	18	1	18	1	19	23
24	5	33	4	29	3	48	3	14	2	51	2	29	2	12	1	50	1	36	1	27	1	22	1	19	1	17	1	17	1	17	1	17	24
25	5	47	4	41	3	57	3	22	2	58	2	35	2	17	1	53	1	38	1	28	1	23	1	20	1	18	1	16	1	16	1	16	25
26	6	1	4	52	4	6	3	30	3	4	2	41	2	22	1	57	1	41	1	30	1	24	1	20	1	18	1	16	1	15	1	15	26
27	6	14	5	4	4	15	3	38	3	10	2	47	2	27	2	0	1	43	1	32	1	25	1	21	1	18	1	15	1	14	1	13	27
28	6	27	5	15	4	23	3	45	3	16	2	53	2	32	2	4	1	46	1	34	1	27	1	21	1	18	1	15	1	13	1	12	28
29	6	38	5	26	4	32	3	53	3	22	2	58	2	38	2	8	1	49	1	36	1	28	1	22	1	18	1	15	1	13	1	11	29
30	6	50	5	36	4	41	4	0	3	28	3	3	2	44	2	12	1	52	1	38	1	29	1	23	1	19	1	15	1	13	1	11	30
31	7	0	5	45	4	50	4	7	3	34	3	8	2	49	2	16	1	55	1	40	1	30	1	24	1	19	1	15	1	13	1	11	31
32			5	53	4	58	4	14	3	40	3	13	2	54	2	19	1	57	1	41	1	31	1	24	1	19	1	15	1	13	1	11	32
33					5	5	4	20	3	46	3	18	2	58	2	22	1	59	1	42	1	31	1	24	1	19	1	15	1	13	1	11	33
34							4	25	3	51	3	22	3	1	2	24	2	1	1	43	1	32	1	25	1	20	1	15	1	13	1	11	34
35									3	56	3	26	3	3	2	26	2	2	1	45	1	33	1	25	1	20	1	15	1	13	1	11	35
36											3	30	3	5	2	28	2	4	1	46	1	34	1	25	1	20	1	15	1	12	1	10	36
37													3	7	2	30	2	6	1	47	1	35	1	25	1	20	1	15	1	12	1	10	37
38															2	32	2	7	1	48	1	35	1	25	1	20	1	15	1	12	1	10	38
39															2	34	2	8	1	49	1	35	1	25	1	19	1	15	1	12	1	10	39
40																	2	9	1	50	1	35	1	25	1	19	1	15	1	11	1	9	40
41																	2	10	1	50	1	35	1	25	1	19	1	15	1	11	1	8	41
42																			1	51	1	36	1	25	1	19	1	14	1	10	1	7	42
43																			1	52	1	36	1	25	1	18	1	13	1	9	1	6	43
44																					1	36	1	25	1	18	1	13	1	8	1	5	44
46																					1	36	1	25	1	17	1	12	1	7	1	3	46
48																							1	25	1	17	1	10	1	5	1	1	48
50																									1	17	1	8	1	4		59	50
52																											1	7	1	3		58	52
54																													1	2		57	54
56																																56	56
58																																	58
60																																	60
62																																	62
64																																	64
66																																	66
68																																	68
70																																	70
72																																	72
74																																	74
76																																	76
78																																	78
80																																	80
82																																	82
84																																	84
86																																	86
	6°		7°		8°		9°		10°		11°		12°		14°		16°		18°		20°		22°		24°		26°		28°		30°		

Third Correction to Apparent Distance 24°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.															☽'s App Alt.
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6																	6
7																	7
8	4 58																8
9	4 12																9
10	3 39	3 51															10
11	3 11	3 21	3 30														11
12	2 48	2 56	3 5	3 12													12
13	2 30	2 37	2 44	2 49													13
14	2 16	2 22	2 27	2 32													14
15	2 4	2 9	2 14	2 18													15
16	1 54	1 59	2 3	2 6	2 11												16
17	1 46	1 50	1 53	1 56	2 0												17
18	1 40	1 43	1 45	1 47	1 51												18
19	1 35	1 37	1 39	1 41	1 43												19
20	1 30	1 32	1 33	1 34	1 36	1 38											20
21	1 26	1 27	1 28	1 29	1 30	1 31											21
22	1 22	1 23	1 24	1 24	1 25	1 25											22
23	1 20	1 20	1 21	1 21	1 21	1 21											23
24	1 18	1 18	1 19	1 19	1 18	1 17	1 15										24
25	1 16	1 16	1 17	1 17	1 16	1 14	1 11										25
26	1 14	1 14	1 14	1 14	1 13	1 11	1 8										26
27	1 13	1 13	1 12	1 12	1 11	1 9	1 6										27
28	1 12	1 12	1 11	1 10	1 9	1 7	1 4	1 1									28
29	1 11	1 11	1 10	1 9	1 8	1 5	1 2	59									29
30	1 11	1 10	1 9	1 8	1 7	1 4	1 0	57									30
31	1 10	1 9	1 8	1 8	1 6	1 2	58	55									31
32	1 9	1 9	1 8	1 7	1 5	1 1	57	54	51								32
33	1 9	1 8	1 7	1 6	1 4	1 1	57	53	50								33
34	1 9	1 7	1 6	1 5	1 3	1 0	57	53	49								34
35	1 9	1 7	1 6	1 5	1 2	1 0	56	52	48								35
36	1 8	1 7	1 6	1 4	1 2	1 0	56	51	47	44							36
37	1 8	1 6	1 5	1 3	1 1	58	55	51	46	43							37
38	1 8	1 6	1 5	1 3	1 0	57	54	50	46	43							38
39	1 8	1 6	1 4	1 2	59	56	52	48	45	42							39
40	1 7	1 5	1 4	1 2	59	55	51	47	44	41	39						40
41	1 6	1 4	1 3	1 1	58	54	50	47	44	41	38						41
42	1 5	1 4	1 3	1 1	57	54	50	47	44	41	38						42
43	1 4	1 3	1 2	1 0	56	53	50	47	43	40	37	34					43
44	1 3	1 2	1 1	59	56	53	50	47	43	40	37	34					44
46	1 1	1 0	59	58	55	52	49	46	43	40	37	34	32				46
48	59	59	58	57	54	51	49	46	43	40	37	34	32				48
50	57	57	56	55	53	50	48	45	43	40	37	34	32	30			50
52	55	54	53	52	51	49	47	45	43	40	37	34	32	30			52
54	54	52	51	50	49	47	46	44	42	39	37	34	32	29	27		54
56	53	51	49	48	47	45	44	43	41	38	36	34	31	29	27		56
58	52	49	47	46	45	44	43	42	40	37	35	33	31	29	27	26	58
60		47	45	44	43	42	41	40	38	36	34	32	30	28	27	26	60
62			43	43	41	40	39	38	37	35	33	31	29	28	27	26	62
64				42	39	38	38	37	36	34	32	30	29	28	27	26	64
66					38	37	37	36	35	33	31	29	28	27	26	25	66
68					37	35	35	34	34	33	31	29	28	27	26	25	68
70						34	34	33	33	32	30	28	27	26	25	25	70
72						33	33	32	32	31	29	28	26	25	24	25	72
74							32	31	31	30	29	28	26	25	24		74
76							31	30	30	29	28	27	25	24	24		76
78								29	29	29	28	27	25	24			78
80								28	28	28	27	26	25	24			80
82									27	27	26	25	24				82
84									26	26	25	25	24				84
86										26	25	25					86
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°	

TABLE XVIII

Third Correction, to Apparent Distance 28°

☽'s App Alt	APPARENT ALTITUDE OF THE SUN, OR STAR.																		☽'s App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°			
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″			°
6	1 20	1 23	1 27	1 33	1 40	1 49	2 00	2 28	2 56	3 24	3 53	4 21	4 48	5 15	5 42	6 9			6
7	1 25	1 20	1 23	1 27	1 32	1 38	1 45	2 5	2 26	2 49	3 13	3 36	3 58	4 20	4 43	5 6			7
8	1 32	1 24	1 20	1 22	1 25	1 29	1 35	1 50	2 7	2 26	2 46	3 4	3 23	3 42	4 1	4 20			8
9	1 41	1 29	1 23	1 20	1 22	1 24	1 28	1 39	1 52	2 7	2 22	2 37	2 53	3 9	3 25	3 41			9
10	1 53	1 37	1 28	1 23	1 20	1 21	1 23	1 30	1 39	1 52	2 5	2 18	2 31	2 44	2 58	3 11			10
11	2 6	1 46	1 34	1 27	1 23	1 20	1 21	1 24	1 31	1 41	1 52	2 4	2 15	2 26	2 37	2 48			11
12	2 19	1 56	1 41	1 32	1 26	1 22	1 19	1 21	1 26	1 33	1 42	1 52	2 1	2 10	2 20	2 30			12
13	2 32	2 6	1 49	1 38	1 30	1 25	1 21	1 20	1 23	1 28	1 34	1 42	1 49	1 57	2 6	2 15			13
14	2 46	2 17	1 58	1 44	1 34	1 28	1 23	1 19	1 21	1 24	1 28	1 34	1 40	1 47	1 55	2 3			14
15	3 00	2 28	2 7	1 51	1 39	1 32	1 25	1 20	1 19	1 21	1 24	1 28	1 33	1 39	1 45	1 52			15
16	3 14	2 39	2 16	1 58	1 45	1 36	1 28	1 21	1 18	1 19	1 21	1 24	1 28	1 33	1 38	1 44			16
17	3 28	2 51	2 25	2 5	1 51	1 41	1 32	1 23	1 19	1 18	1 19	1 21	1 24	1 28	1 33	1 38			17
18	3 41	3 2	2 35	2 13	1 58	1 46	1 36	1 25	1 20	1 17	1 18	1 19	1 21	1 24	1 28	1 33			18
19	3 55	3 13	2 45	2 21	2 5	1 52	1 41	1 27	1 21	1 18	1 16	1 17	1 18	1 21	1 24	1 28			19
20	4 9	3 24	2 55	2 29	2 11	1 57	1 46	1 30	1 23	1 18	1 16	1 15	1 16	1 18	1 21	1 24			20
21	4 23	3 35	3 4	2 37	2 17	2 3	1 51	1 33	1 25	1 19	1 16	1 14	1 15	1 16	1 18	1 20			21
22	4 36	3 46	3 13	2 45	2 24	2 9	1 56	1 36	1 27	1 20	1 16	1 13	1 14	1 15	1 16	1 17			22
23	4 49	3 57	3 22	2 53	2 31	2 14	2 1	1 40	1 29	1 22	1 17	1 13	1 13	1 13	1 14	1 15			23
24	5 2	4 8	3 31	3 0	2 37	2 20	2 6	1 43	1 31	1 24	1 18	1 14	1 12	1 12	1 12	1 13			24
25	5 16	4 19	3 40	3 8	2 43	2 26	2 11	1 47	1 34	1 26	1 19	1 15	1 13	1 11	1 11	1 12			25
26	5 29	4 30	3 49	3 15	2 50	2 32	2 16	1 51	1 36	1 28	1 20	1 15	1 13	1 11	1 11	1 11			26
27	5 42	4 41	3 58	3 23	2 57	2 38	2 21	1 55	1 39	1 30	1 21	1 16	1 13	1 11	1 10	1 10			27
28	5 55	4 52	4 7	3 30	3 4	2 44	2 26	1 59	1 42	1 32	1 22	1 17	1 14	1 11	1 10	1 10			28
29	6 7	5 3	4 16	3 38	3 11	2 50	2 31	2 3	1 45	1 34	1 24	1 18	1 14	1 12	1 10	1 10			29
30	6 19	5 13	4 25	3 45	3 18	2 55	2 36	2 7	1 47	1 36	1 26	1 19	1 15	1 12	1 10	1 9			30
31	6 31	5 23	4 34	3 52	3 25	3 1	2 41	2 10	1 50	1 38	1 27	1 20	1 15	1 12	1 10	1 9			31
32	6 42	5 32	4 43	3 59	3 31	3 7	2 46	2 13	1 53	1 40	1 29	1 21	1 16	1 12	1 10	1 9			32
33	6 53	5 41	4 51	4 6	3 37	3 12	2 51	2 17	1 56	1 42	1 31	1 22	1 16	1 12	1 10	1 9			33
34	7 4	5 50	4 58	4 13	3 43	3 17	2 55	2 20	1 58	1 44	1 32	1 23	1 17	1 12	1 10	1 9			34
35	7 15	5 59	5 5	4 20	3 48	3 21	2 59	2 23	2 00	1 46	1 33	1 23	1 17	1 13	1 10	1 8			35
36		6 8	5 11	4 26	3 53	3 25	3 3	2 26	2 3	1 47	1 34	1 24	1 18	1 13	1 10	1 8			36
37			5 17	4 32	3 58	3 29	3 7	2 29	2 5	1 49	1 35	1 25	1 18	1 13	1 10	1 8			37
38				4 38	4 2	3 33	3 10	2 32	2 7	1 51	1 36	1 26	1 19	1 14	1 10	1 8			38
39					4 6	3 37	3 12	2 34	2 9	1 52	1 37	1 27	1 19	1 14	1 11	1 8			39
40						3 41	3 15	2 37	2 11	1 53	1 38	1 27	1 20	1 15	1 11	1 8			40
41							3 17	2 40	2 13	1 54	1 39	1 28	1 20	1 15	1 11	1 8			41
42								2 42	2 15	1 55	1 40	1 29	1 21	1 15	1 10	1 7			42
43								2 44	2 17	1 56	1 40	1 29	1 21	1 15	1 10	1 7			43
44									2 18	1 57	1 41	1 30	1 21	1 15	1 10	1 7			44
46									2 19	1 59	1 42	1 30	1 22	1 15	1 10	1 7			46
48										2 0	1 43	1 31	1 22	1 15	1 10	1 6			48
50											1 44	1 32	1 23	1 15	1 10	1 6			50
52												1 33	1 24	1 15	1 9	1 5			52
54													1 25	1 15	1 9	1 5			54
56														1 15	1 9	1 4			56
58															1 9	1 3			58
60																1 3			60
62																			62
64																			64
66																			66
68																			68
70																			70
72																			72
74																			74
76																			76
78																			78
80																			80
82																			82
84																			84
86																			86
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°			

Third Correction to Apparent Distance 28°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.															☽'s App Alt.
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	6 37	7 4															6
7	5 28	5 49	6 8														7
8	4 49	4 57	5 11														8
9	3 58	4 13	4 26	4 38													9
10	3 25	3 38	3 50	4 2													10
11	3 0	3 12	3 23	3 33													11
12	2 40	2 50	2 59	3 7	3 22												12
13	2 24	2 33	2 41	2 48	3 0												13
14	2 11	2 18	2 25	2 31	2 42												14
15	1 59	2 6	2 12	2 17	2 27												15
16	1 50	1 56	2 1	2 6	2 14	2 21											16
17	1 43	1 48	1 52	1 56	2 3	2 9											17
18	1 37	1 41	1 45	1 48	1 54	1 59											18
19	1 31	1 35	1 38	1 41	1 46	1 50											19
20	1 26	1 29	1 32	1 34	1 38	1 42	1 45										20
21	1 22	1 25	1 27	1 29	1 32	1 36	1 38										21
22	1 19	1 21	1 23	1 25	1 28	1 30	1 32										22
23	1 17	1 18	1 20	1 22	1 24	1 26	1 27										23
24	1 15	1 16	1 17	1 18	1 20	1 22	1 23	1 24									24
25	1 13	1 14	1 14	1 15	1 16	1 18	1 19	1 19									25
26	1 11	1 12	1 12	1 13	1 13	1 14	1 15	1 15									26
27	1 10	1 11	1 11	1 11	1 11	1 11	1 12	1 12									27
28	1 10	1 10	1 10	1 10	1 10	1 10	1 9	1 9	1 9								28
29	1 10	1 10	1 10	1 9	1 9	1 8	1 7	1 6	1 6								29
30	1 9	1 9	1 9	1 8	1 8	1 7	1 6	1 4	1 3								30
31	1 8	1 8	1 7	1 7	1 6	1 5	1 4	1 2	1 1								31
32	1 8	1 7	1 6	1 6	1 5	1 4	1 3	1 1	1 0	59							32
33	1 7	1 6	1 5	1 5	1 4	1 3	1 2	1 0	58	56							33
34	1 7	1 5	1 4	1 4	1 3	1 2	1 1	59	57	54							34
35	1 7	1 5	1 4	1 3	1 2	1 1	1 0	58	55	53							35
36	1 6	1 5	1 4	1 3	1 1	1 0	58	56	54	52	51						36
37	1 6	1 4	1 3	1 2	1 0	59	57	55	53	51	50						37
38	1 6	1 4	1 3	1 1	59	58	56	54	52	50	49						38
39	1 6	1 4	1 2	1 0	59	57	55	53	51	49	47						39
40	1 6	1 4	1 2	1 0	58	57	55	52	50	48	46	44					40
41	1 6	1 4	1 2	1 0	58	56	54	51	49	47	45	43					41
42	1 5	1 4	1 2	59	57	55	53	50	48	46	44	42					42
43	1 5	1 3	1 1	59	57	55	53	50	48	46	44	42	41				43
44	1 5	1 3	1 1	59	56	54	52	50	47	45	43	41	40				44
46	1 4	1 2	1 0	58	55	53	51	49	47	44	42	40	39				46
48	1 3	1 1	59	57	54	52	50	48	46	43	41	39	38	37			48
50	1 3	1 1	58	56	53	51	49	47	45	42	40	38	37	36			50
52	1 2	1 0	57	55	52	50	48	46	44	42	40	38	36	35	34		52
54	1 2	59	56	54	51	49	47	45	43	41	39	37	35	34	33		54
56	1 1	58	55	53	50	48	46	44	42	40	38	36	35	34	33	32	56
58	1 0	57	54	52	49	47	45	43	41	39	37	36	35	34	32	31	58
60	58	55	53	51	48	46	44	42	40	38	37	36	35	34	32	31	60
62	56	54	52	50	47	45	43	41	39	38	37	36	35	34	32	31	62
64		52	50	49	46	44	42	40	38	37	36	35	34	33	32	30	64
66			48	48	45	43	41	39	38	37	36	35	34	33	31	29	66
68				46	43	41	40	38	37	36	35	34	33	32	30	28	68
70					42	40	39	38	37	36	35	34	33	31	29		70
72					41	39	38	37	36	35	34	33	32	30	28		72
74						39	37	36	35	34	33	32	30	28			74
76						38	36	35	34	34	33	31	29	27			76
78							36	34	34	33	32	30	28				78
80							35	34	33	32	31	30	28				80
82								33	32	31	30	29					82
84								32	32	31	30	29					84
86									31	30	29						86
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°	

TABLE XVIII

Third Correction to Apparent Distance 32°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																☽'s App Alt.
	6°	7°	8°	9°	10°	11	12°	14°	16°	18°	20°	22°	24°	26°	28°	30	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	1 18	1 21	1 25	1 30	1 37	1 47	1 59	2 23	2 48	3 13	3 39	4 5	4 30	4 55	5 20	5 45	6
7	1 23	1 18	1 21	1 24	1 28	1 33	1 42	2 0	2 18	2 37	2 58	3 20	3 42	4 4	4 25	4 46	7
8	1 30	1 22	1 18	1 20	1 22	1 25	1 29	1 42	1 57	2 14	2 32	2 50	3 8	3 26	3 44	4 2	8
9	1 38	1 27	1 20	1 18	1 19	1 21	1 23	1 31	1 44	1 58	2 12	2 26	2 41	2 56	3 11	3 2.	9
10	1 47	1 33	1 23	1 20	1 18	1 19	1 20	1 25	1 34	1 45	1 57	2 9	2 21	2 34	2 46	2 59	10
11	1 57	1 41	1 28	1 23	1 19	1 17	1 18	1 21	1 27	1 36	1 46	1 56	2 6	2 17	2 28	2 39	11
12	2 9	1 50	1 34	1 27	1 22	1 19	1 17	1 19	1 23	1 29	1 37	1 46	1 55	2 4	2 1.	2 23	12
13	2 21	1 59	1 41	1 32	1 26	1 21	1 18	1 17	1 20	1 24	1 30	1 37	1 45	1 53	2 1	2 9	13
14	2 34	2 8	1 50	1 38	1 30	1 24	1 20	1 16	1 18	1 21	1 25	1 30	1 36	1 43	1 51	1 58	14
15	2 47	2 18	1 59	1 45	1 35	1 28	1 22	1 17	1 16	1 18	1 21	1 25	1 30	1 35	1 42	1 49	15
16	2 59	2 28	2 7	1 52	1 41	1 32	1 25	1 19	1 15	1 16	1 18	1 21	1 25	1 29	1 35	1 41	16
17	3 12	2 38	2 16	1 59	1 47	1 36	1 28	1 21	1 16	1 15	1 16	1 18	1 21	1 25	1 30	1 35	17
18	3 25	2 48	2 25	2 7	1 52	1 41	1 32	1 23	1 17	1 14	1 15	1 17	1 19	1 22	1 25	1 29	18
19	3 38	2 58	2 34	2 14	1 58	1 46	1 36	1 25	1 18	1 15	1 14	1 15	1 17	1 19	1 22	1 25	19
20	3 50	3 9	2 43	2 21	2 4	1 51	1 40	1 27	1 20	1 16	1 13	1 14	1 15	1 17	1 19	1 21	20
21	4 3	3 19	2 52	2 28	2 10	1 56	1 45	1 30	1 22	1 17	1 14	1 13	1 14	1 15	1 16	1 18	21
22	4 15	3 30	3 0	2 35	2 17	2 2	1 56	1 33	1 24	1 18	1 14	1 11	1 12	1 13	1 14	1 16	22
23	4 28	3 40	3 9	2 42	2 24	2 7	1 55	1 36	1 26	1 19	1 15	1 12	1 11	1 12	1 13	1 14	23
24	4 40	3 51	3 17	2 50	2 30	2 13	1 59	1 39	1 28	1 21	1 16	1 12	1 10	1 11	1 11	1 12	24
25	4 52	4 1	3 26	2 57	2 36	2 18	2 4	1 42	1 30	1 22	1 17	1 13	1 11	1 10	1 10	1 10	25
26	5 4	4 12	3 34	3 5	2 43	2 24	2 8	1 46	1 32	1 24	1 18	1 13	1 11	1 9	1 9	1 9	26
27	5 16	4 22	3 43	3 12	2 50	2 30	2 13	1 50	1 34	1 26	1 19	1 14	1 11	1 9	1 8	1 8	27
28	5 28	4 33	3 52	3 20	2 57	2 35	2 17	1 53	1 37	1 27	1 20	1 15	1 11	1 9	1 7	1 8	28
29	5 41	4 44	4 1	3 28	3 3	2 41	2 21	1 57	1 40	1 29	1 21	1 16	1 12	1 10	1 8	1 7	29
30	5 53	4 54	4 10	3 35	3 9	2 46	2 26	2 0	1 43	1 31	1 23	1 17	1 13	1 10	1 8	1 6	30
31	6 5	5 4	4 19	3 42	3 15	2 52	2 31	2 4	1 46	1 33	1 24	1 18	1 13	1 10	1 8	1 6	31
32	6 17	5 14	4 27	3 49	3 21	2 57	2 36	2 8	1 49	1 36	1 26	1 19	1 14	1 11	1 9	1 7	32
33	6 29	5 23	4 35	3 56	3 27	3 2	2 41	2 12	1 52	1 38	1 27	1 20	1 15	1 11	1 9	1 7	33
34	6 40	5 32	4 43	4 3	3 32	3 7	2 46	2 15	1 55	1 40	1 29	1 21	1 16	1 12	1 9	1 7	34
35	6 50	5 40	4 50	4 9	3 38	3 12	2 50	2 19	1 58	1 43	1 31	1 22	1 17	1 13	1 9	1 7	35
36	6 59	5 48	4 57	4 15	3 43	3 16	2 54	2 22	2 1	1 45	1 32	1 23	1 18	1 13	1 10	1 7	36
37	7 7	5 56	5 4	4 21	3 49	3 21	2 59	2 25	2 4	1 47	1 34	1 24	1 19	1 14	1 10	1 7	37
38	7 15	6 3	5 10	4 29	3 54	3 25	3 3	2 28	2 6	1 49	1 35	1 25	1 19	1 14	1 10	1 7	38
39	7 22	6 10	5 16	4 33	3 59	3 30	3 7	2 31	2 8	1 51	1 36	1 26	1 20	1 15	1 10	1 7	39
40		6 17	5 21	4 38	4 4	3 34	3 11	2 34	2 10	1 52	1 38	1 27	1 20	1 15	1 11	1 8	40
41			5 26	4 43	4 8	3 38	3 15	2 36	2 13	1 54	1 39	1 28	1 21	1 16	1 12	1 8	41
42				4 47	4 12	3 42	3 18	2 39	2 16	1 56	1 41	1 29	1 22	1 16	1 12	1 8	42
43					4 16	3 46	3 21	2 42	2 18	1 58	1 42	1 30	1 22	1 16	1 12	1 8	43
44						3 50	3 24	2 45	2 20	2 0	1 43	1 31	1 23	1 17	1 12	1 8	44
46							3 27	2 50	2 23	2 2	1 45	1 32	1 24	1 17	1 12	1 8	46
48								2 54	2 26	2 4	1 47	1 34	1 25	1 18	1 12	1 8	48
50									2 29	2 6	1 49	1 36	1 26	1 19	1 13	1 8	50
52										2 8	1 51	1 38	1 28	1 19	1 13	1 8	52
54											1 53	1 39	1 29	1 20	1 14	1 8	54
56												1 40	1 30	1 21	1 14	1 8	56
58													1 30	1 21	1 14	1 8	58
60														1 21	1 14	1 8	60
62															1 14	1 8	62
64																1 8	64
66																	66
68																	68
70																	70
72																	72
74																	74
76																	76
78																	78
80																	80
82																	82
84																	84
86																	86
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	

TABLE XVIII.

Third Correction, to Apparent Distance 32°.

☽'s Ap Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.															☽'s Ap Alt.
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	6 10	6 33	6 55	7 15													6
7	5 7	5 26	5 44	6 2													7
8	4 20	4 37	4 52	5 7	5 35												8
9	3 41	3 56	4 10	4 24	4 50												9
10	3 12	3 25	3 38	3 50	4 12												10
11	2 51	3 2	3 13	3 23	3 42												11
12	2 33	2 43	2 51	3 00	3 17	3 33											12
13	2 18	2 26	2 34	2 42	2 56	3 9											13
14	2 5	2 12	2 19	2 27	2 39	2 50											14
15	1 55	2 2	2 8	2 14	2 25	2 35											15
16	1 47	1 53	1 58	2 3	2 13	2 22	2 30										16
17	1 40	1 45	1 50	1 54	2 2	2 11	2 18										17
18	1 34	1 38	1 42	1 46	1 53	2 0	2 7										18
19	1 29	1 33	1 36	1 39	1 45	1 51	1 57										19
20	1 25	1 28	1 31	1 33	1 38	1 43	1 49	1 54									20
21	1 21	1 24	1 26	1 28	1 32	1 37	1 42	1 46									21
22	1 18	1 20	1 22	1 24	1 27	1 31	1 35	1 39									22
23	1 15	1 17	1 19	1 20	1 23	1 27	1 30	1 34									23
24	1 13	1 14	1 16	1 17	1 20	1 23	1 26	1 29	1 32								24
25	1 11	1 12	1 13	1 15	1 17	1 19	1 21	1 24	1 26								25
26	1 9	1 10	1 11	1 12	1 14	1 16	1 17	1 19	1 21								26
27	1 8	1 9	1 9	1 10	1 12	1 13	1 14	1 16	1 17								27
28	1 8	1 8	1 8	1 9	1 10	1 11	1 12	1 13	1 14	1 15							28
29	1 7	1 7	1 7	1 7	1 8	1 9	1 9	1 10	1 11	1 11							29
30	1 6	1 6	1 6	1 6	1 6	1 7	1 7	1 7	1 8	1 8							30
31	1 6	1 6	1 6	1 5	1 5	1 5	1 5	1 5	1 5	1 5							31
32	1 6	1 5	1 5	1 4	1 4	1 4	1 4	1 4	1 3	1 3	1 3						32
33	1 5	1 4	1 4	1 3	1 3	1 2	1 2	1 2	1 1	1 1	1 1						33
34	1 5	1 4	1 3	1 2	1 2	1 1	1 0	1 0	59	59	59						34
35	1 5	1 3	1 3	1 2	1 1	1 0	59	58	57	57	57						35
36	1 5	1 3	1 2	1 1	1 1	1 0	58	57	56	56	55	54					36
37	1 5	1 3	1 1	1 0	1 0	59	57	56	55	55	54	53					37
38	1 5	1 3	1 1	1 0	59	58	56	55	54	54	53	52					38
39	1 5	1 3	1 1	59	58	57	56	54	53	52	51	50					39
40	1 5	1 2	1 0	59	58	56	55	53	52	51	50	49	48				40
41	1 5	1 2	1 0	59	58	56	54	52	51	50	49	48	47				41
42	1 5	1 2	1 0	59	57	55	53	51	50	49	48	47	47				42
43	1 5	1 2	1 0	58	56	54	52	51	49	48	47	47	46	45			43
44	1 5	1 2	1 0	58	55	53	51	50	49	48	47	46	45	44			44
46	1 5	1 2	1 0	58	55	52	51	50	48	47	46	45	44	43			46
48	1 5	1 2	59	57	55	52	50	49	47	46	45	44	43	42	41		48
50	1 5	1 2	59	57	54	51	49	48	47	46	44	43	42	41	40		50
52	1 4	1 1	58	56	53	51	49	47	46	45	43	42	41	40	39	38	52
54	1 4	1 1	58	56	53	50	48	46	45	44	42	41	40	39	38	37	54
56	1 4	1 1	58	56	52	49	47	45	44	42	41	40	39	38	37	36	56
58	1 4	1 1	58	56	52	49	47	45	43	41	40	39	38	37	36	35	58
60	1 4	1 0	57	55	51	48	46	44	42	40	39	38	37	36	35	35	60
62	1 3	59	56	54	51	48	45	43	41	39	38	37	36	35	34	34	62
64	1 3	59	56	54	50	47	45	43	41	38	38	37	36	35	34	33	64
66	1 3	59	56	54	50	47	44	42	40	38	37	36	35	34	33		66
68		59	55	53	48	46	44	42	40	38	37	36	35	34	33		68
70			55	52	48	45	43	41	39	37	36	35	34	33			70
72				52	47	44	42	40	38	37	36	35	33	32			72
74					47	44	42	40	38	36	35	34	32				74
76					47	43	41	39	38	36	35	34	32				76
78						43	41	39	37	35	34	33					78
80						43	41	39	37	35	34	33					80
82							40	38	36	34	33						82
84							39	38	36	34	33						84
86								37	35	34							86
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°	

TABLE XVIII.

Third Correction, to Apparent Distance 36°.

D's App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																				D's App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°					
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″					°
6	1 17	1 19	1 22	1 27	1 33	1 42	1 52	2 13	2 34	2 56	3 19	3 43	4 7	4 31	4 55	5 18					6
7	1 20	1 17	1 19	1 22	1 26	1 31	1 37	1 52	2 10	2 28	2 48	3 8	3 27	3 46	4 6	4 25					7
8	1 25	1 20	1 17	1 19	1 21	1 23	1 27	1 39	1 53	2 8	2 24	2 40	2 57	3 14	3 30	3 46					8
9	1 32	1 24	1 19	1 17	1 18	1 19	1 21	1 29	1 40	1 52	2 5	2 19	2 33	2 47	3 2	3 16					9
10	1 42	1 30	1 23	1 19	1 16	1 17	1 18	1 23	1 31	1 40	1 51	2 2	2 14	2 27	2 40	2 52					10
11	1 52	1 37	1 28	1 22	1 18	1 16	1 17	1 19	1 25	1 33	1 42	1 51	2 1	2 12	2 23	2 33					11
12	2 3	1 45	1 34	1 26	1 20	1 17	1 15	1 17	1 21	1 27	1 34	1 41	1 50	1 59	2 8	2 17					12
13	2 14	1 53	1 40	1 30	1 23	1 19	1 16	1 15	1 18	1 23	1 28	1 34	1 41	1 49	1 57	2 5					13
14	2 25	2 1	1 47	1 35	1 26	1 21	1 18	1 14	1 16	1 19	1 24	1 29	1 35	1 41	1 49	1 55					14
15	2 36	2 10	1 54	1 41	1 30	1 25	1 21	1 16	1 15	1 17	1 21	1 25	1 30	1 35	1 41	1 46					15
16	2 48	2 20	2 2	1 47	1 35	1 29	1 24	1 18	1 13	1 15	1 18	1 21	1 25	1 29	1 34	1 39					16
17	3 0	2 30	2 10	1 53	1 40	1 33	1 28	1 20	1 15	1 14	1 16	1 18	1 21	1 24	1 28	1 33					17
18	3 12	2 40	2 18	2 0	1 46	1 38	1 32	1 22	1 16	1 13	1 15	1 16	1 18	1 20	1 23	1 27					18
19	3 24	2 49	2 27	2 7	1 51	1 43	1 36	1 25	1 18	1 15	1 14	1 15	1 16	1 18	1 20	1 23					19
20	3 35	2 59	2 35	2 14	1 57	1 48	1 40	1 28	1 21	1 16	1 12	1 13	1 14	1 16	1 18	1 20					20
21	3 46	3 9	2 43	2 21	2 3	1 53	1 44	1 31	1 23	1 17	1 13	1 12	1 13	1 14	1 16	1 18					21
22	3 57	3 18	2 51	2 28	2 9	1 58	1 48	1 34	1 25	1 18	1 14	1 11	1 12	1 13	1 14	1 15					22
23	4 9	3 28	2 59	2 35	2 16	2 3	1 52	1 36	1 26	1 19	1 14	1 11	1 10	1 11	1 12	1 13					23
24	4 20	3 37	3 7	2 42	2 22	2 8	1 56	1 39	1 28	1 20	1 15	1 11	1 9	1 9	1 10	1 11					24
25	4 32	3 47	3 15	2 49	2 28	2 13	2 0	1 42	1 30	1 22	1 15	1 11	1 9	1 8	1 8	1 9					25
26	4 43	3 56	3 23	2 56	2 34	2 18	2 4	1 45	1 32	1 23	1 16	1 12	1 9	1 7	1 7	1 7					26
27	4 55	4 6	3 31	3 3	2 40	2 23	2 9	1 48	1 35	1 25	1 17	1 12	1 9	1 7	1 6	1 6					27
28	5 6	4 15	3 39	3 10	2 46	2 28	2 13	1 52	1 38	1 27	1 19	1 13	1 9	1 7	1 6	1 6					28
29	5 17	4 25	3 47	3 17	2 52	2 34	2 18	1 56	1 40	1 29	1 20	1 13	1 9	1 7	1 6	1 5					29
30	5 28	4 34	3 54	3 24	2 58	2 39	2 23	2 0	1 43	1 31	1 21	1 14	1 10	1 8	1 6	1 5					30
31	5 39	4 43	4 2	3 31	3 4	2 44	2 28	2 4	1 46	1 33	1 23	1 16	1 11	1 8	1 6	1 5					31
32	5 49	4 52	4 10	3 37	3 10	2 49	2 33	2 7	1 49	1 35	1 25	1 17	1 12	1 9	1 7	1 5					32
33	5 59	5 0	4 18	3 44	3 16	2 54	2 37	2 10	1 51	1 37	1 27	1 19	1 14	1 10	1 7	1 5					33
34	6 9	5 8	4 25	3 50	3 22	2 59	2 41	2 13	1 53	1 39	1 29	1 21	1 15	1 11	1 8	1 6					34
35	6 19	5 16	4 32	3 56	3 28	3 4	2 46	2 16	1 56	1 41	1 30	1 22	1 16	1 11	1 8	1 6					35
36	6 28	5 24	4 38	4 2	3 33	3 9	2 50	2 19	1 59	1 43	1 32	1 23	1 17	1 12	1 9	1 6					36
37	6 38	5 32	4 45	4 8	3 39	3 14	2 54	2 22	2 1	1 45	1 33	1 24	1 18	1 13	1 9	1 6					37
38	6 47	5 40	4 52	4 14	3 44	3 18	2 58	2 25	2 4	1 47	1 35	1 26	1 19	1 14	1 10	1 6					38
39	6 57	5 48	4 59	4 20	3 49	3 23	3 2	2 28	2 6	1 49	1 36	1 27	1 20	1 14	1 10	1 7					39
40	7 6	5 56	5 5	4 25	3 54	3 27	3 6	2 31	2 8	1 51	1 38	1 28	1 21	1 15	1 11	1 7					40
41	7 16	6 4	5 12	4 31	3 59	3 31	3 10	2 33	2 11	1 53	1 40	1 30	1 22	1 15	1 11	1 8					41
42	7 25	6 12	5 18	4 36	4 3	3 35	3 13	2 36	2 14	1 55	1 42	1 31	1 22	1 16	1 11	1 8					42
43	7 33	6 19	5 24	4 41	4 8	3 39	3 17	2 39	2 16	1 57	1 43	1 32	1 23	1 16	1 11	1 8					43
44		6 26	5 30	4 46	4 12	3 43	3 20	2 42	2 18	1 59	1 45	1 33	1 24	1 17	1 12	1 9					44
46			5 41	4 55	4 20	3 50	3 26	2 47	2 22	2 2	1 47	1 35	1 25	1 18	1 13	1 9					46
48					4 27	3 57	3 32	2 52	2 26	2 5	1 49	1 37	1 27	1 20	1 14	1 10					48
50							3 38	2 57	2 30	2 8	1 51	1 39	1 29	1 21	1 15	1 10					50
52								3 1	2 33	2 11	1 53	1 41	1 31	1 22	1 16	1 11					52
54									2 36	2 13	1 55	1 43	1 32	1 23	1 16	1 11					54
56										2 15	1 57	1 44	1 33	1 24	1 17	1 11					56
											1 59	1 45	1 34	1 25	1 18	1 12					58
												1 46	1 35	1 26	1 18	1 12					60
													1 36	1 26	1 18	1 12					62
														1 26	1 19	1 12					64
															1 19	1 13					66
																1 13					68
																					70
																					72
																					74
																					76
																					78
																					80
																					82
																					84
																					86
	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°										

TABLE P. EFFECT OF SUN'S PAR.

Add the Numbers above the lines to 3rd Correction, subtract the others.

D's App Alt.	Sun's Apparent Altitude.								
	5	10	20	30	40	50	60	70	80	90
	″	″	″	″	″	″	″	″	″	″
5	0	1	3	5	7					
10	1	0	2	4	5					
20	4	3	1	1	3	4				
30	6	5	3	1	0	2	3			
40	9	8	5	3	2	0	1	2		
50			7	5	4	2	1	0	1	
60				7	5	4	3	2	1	0
70					6	5	4	2	2	
80						6	4			

Third Correction, to Apparent Distance 36°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.															☽'s App Alt.
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	5 40	6 1	6 22	6 43	7 24												6
7	4 43	5 1	5 19	5 36	6 11												7
8	4 1	4 16	4 31	4 46	5 16	5 45											8
9	3 29	3 42	3 55	4 8	4 33	4 58											9
10	3 4	3 16	3 27	3 38	3 59	4 20											10
11	2 43	2 54	3 4	3 13	3 32	3 50											11
12	2 27	2 36	2 45	2 53	3 10	3 25	3 40										12
13	2 13	2 21	2 29	2 37	2 51	3 4	3 16										13
14	2 2	2 9	2 16	2 23	2 36	2 47	2 57										14
15	1 53	1 59	2 5	2 11	2 23	2 33	2 42										15
16	1 45	1 50	1 56	2 1	2 12	2 21	2 29	2 36									16
17	1 38	1 42	1 47	1 53	2 2	2 10	2 17	2 24									17
18	1 32	1 36	1 40	1 45	1 53	2 1	2 7	2 13									18
19	1 27	1 30	1 34	1 38	1 45	1 52	1 58	2 3									19
20	1 23	1 26	1 29	1 33	1 38	1 44	1 49	1 54	1 58								20
21	1 20	1 22	1 25	1 28	1 33	1 38	1 43	1 47	1 51								21
22	1 17	1 18	1 20	1 23	1 28	1 33	1 37	1 41	1 45								22
23	1 14	1 15	1 17	1 19	1 24	1 28	1 32	1 36	1 39								23
24	1 11	1 12	1 14	1 16	1 20	1 23	1 27	1 31	1 34	1 37							24
25	1 9	1 10	1 11	1 13	1 16	1 19	1 22	1 26	1 29	1 31							25
26	1 8	1 8	1 9	1 11	1 13	1 16	1 18	1 21	1 24	1 26							26
27	1 7	1 7	1 8	1 9	1 11	1 13	1 15	1 17	1 20	1 22							27
28	1 6	1 6	1 7	1 8	1 9	1 11	1 12	1 14	1 16	1 18	1 20						28
29	1 6	1 6	1 6	1 7	1 8	1 9	1 10	1 11	1 13	1 14	1 16						29
30	1 5	1 5	1 5	1 6	1 7	1 7	1 8	1 9	1 10	1 11	1 13						30
31	1 5	1 5	1 5	1 5	1 6	1 6	1 6	1 7	1 8	1 9	1 10						31
32	1 4	1 4	1 5	1 5	1 5	1 5	1 5	1 5	1 6	1 7	1 8	1 9					32
33	1 4	1 4	1 4	1 4	1 4	1 4	1 4	1 4	1 4	1 5	1 5	1 6					33
34	1 4	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3					34
35	1 4	1 3	1 3	1 3	1 2	1 1	1 1	1 1	1 1	1 1	1 1	1 1					35
36	1 4	1 3	1 2	1 2	1 1	1 0	1 0	1 0	1 0	1 0	1 0	1 0	1 0				36
37	1 4	1 3	1 2	1 1	59	59	59	59	59	59	59	59	58				37
38	1 4	1 3	1 1	1 0	58	58	58	58	58	58	58	58	57				38
39	1 5	1 3	1 1	1 0	58	58	58	58	57	57	57	56	56				39
40	1 5	1 3	1 1	1 0	58	57	57	57	57	56	56	55	54	53			40
41	1 6	1 3	1 1	59	57	56	56	56	56	55	54	53	52	52			41
42	1 6	1 3	1 1	59	57	56	55	55	55	54	53	52	51	51			42
43	1 6	1 3	1 1	59	56	55	54	54	54	53	52	51	50	50	49		43
44	1 6	1 3	1 1	59	56	54	53	53	53	52	51	50	49	49	48		44
46	1 6	1 3	1 1	59	56	54	53	52	51	50	49	48	48	47	47		46
48	1 7	1 3	1 1	59	56	54	52	51	49	48	47	46	46	45	45	45	48
50	1 7	1 3	1 1	59	56	53	51	50	48	47	46	45	45	44	44	44	50
52	1 7	1 3	1 1	59	55	52	50	49	48	47	46	45	44	43	42	42	52
54	1 7	1 3	1 1	59	55	52	50	48	47	46	45	44	43	42	41	41	54
56	1 7	1 3	1 0	58	55	52	49	48	47	46	45	44	43	42	41	40	56
58	1 7	1 3	1 0	58	55	52	49	47	46	45	44	43	42	41	40	39	58
60	1 7	1 3	1 0	58	55	51	48	46	45	44	43	42	41	40	39	38	60
62	1 7	1 3	1 0	58	54	51	48	46	44	43	42	41	40	39	38		62
64	1 7	1 3	1 0	58	54	51	48	46	44	43	42	40	39	38	37		64
66	1 8	1 3	1 0	57	54	50	47	45	43	42	41	39	38	37			66
68	1 8	1 3	1 0	57	54	50	47	45	43	42	40	39	38	37			68
70	1 8	1 3	1 0	57	53	50	47	44	42	41	40	39	38				70
72		1 3	1 0	57	53	50	46	43	41	40	39	38					72
74			1 0	57	52	49	46	43	41	40	39	38					74
76				57	52	48	45	43	41	39	38	37					76
78					51	48	45	42	40	39	37						78
80					51	47	44	42	40	39	37						80
82						47	44	41	40	38							82
84						47	44	41	39	38							84
86							44	41	39								86
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°	

TABLE XVIII.

Third Correction, to Apparent Distance 40°

D's App Alt	APPARENT ALTITUDE OF THE SUN, OR STAR.																		D's App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°			
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″			°
6	1 16	1 18	1 21	1 25	1 31	1 39	1 47	2 5	2 26	2 48	3 10	3 32	3 54	4 16	4 38	4 59			6
7	1 19	1 16	1 18	1 21	1 24	1 28	1 34	1 48	2 4	2 22	2 40	2 58	3 16	3 34	3 52	4 10			7
8	1 24	1 19	1 16	1 18	1 20	1 22	1 26	1 36	1 50	2 4	2 18	2 33	2 48	3 4	3 20	3 36			8
9	1 31	1 23	1 19	1 16	1 18	1 19	1 21	1 27	1 38	1 49	2 1	2 13	2 25	2 38	2 52	3 5			9
10	1 40	1 29	1 23	1 19	1 16	1 17	1 18	1 21	1 29	1 38	1 48	1 58	2 9	2 20	2 32	2 44			10
11	1 50	1 36	1 28	1 22	1 18	1 15	1 16	1 18	1 23	1 31	1 39	1 48	1 57	2 7	2 17	2 27			11
12	2 1	1 44	1 34	1 26	1 20	1 17	1 15	1 17	1 20	1 26	1 33	1 40	1 48	1 57	2 5	2 13			12
13	2 11	1 52	1 40	1 30	1 23	1 19	1 16	1 16	1 18	1 22	1 28	1 34	1 41	1 48	1 55	2 2			13
14	2 21	2 0	1 46	1 34	1 26	1 21	1 17	1 15	1 17	1 19	1 23	1 28	1 34	1 40	1 46	1 53			14
15	2 31	2 8	1 52	1 39	1 30	1 23	1 19	1 16	1 15	1 17	1 20	1 23	1 27	1 32	1 38	1 44			15
16	2 41	2 16	1 58	1 44	1 34	1 26	1 21	1 17	1 14	1 15	1 17	1 19	1 22	1 26	1 31	1 37			16
17	2 52	2 24	2 4	1 49	1 38	1 30	1 24	1 19	1 15	1 14	1 15	1 17	1 19	1 22	1 26	1 31			17
18	3 3	2 32	2 11	1 54	1 43	1 34	1 28	1 21	1 16	1 13	1 14	1 15	1 17	1 19	1 22	1 26			18
19	3 14	2 41	2 18	2 0	1 48	1 39	1 32	1 23	1 17	1 14	1 13	1 14	1 15	1 17	1 19	1 22			19
20	3 25	2 50	2 25	2 6	1 53	1 43	1 36	1 25	1 19	1 15	1 12	1 12	1 13	1 15	1 16	1 19			20
21	3 36	2 59	2 32	2 12	1 58	1 47	1 39	1 27	1 20	1 16	1 13	1 11	1 12	1 13	1 14	1 16			21
22	3 47	3 8	2 40	2 18	2 4	1 52	1 43	1 30	1 22	1 17	1 13	1 11	1 11	1 12	1 13	1 14			22
23	3 58	3 17	2 48	2 25	2 10	1 57	1 47	1 33	1 24	1 18	1 14	1 12	1 10	1 10	1 11	1 12			23
24	4 9	3 26	2 56	2 32	2 15	2 2	1 51	1 37	1 26	1 19	1 15	1 12	1 9	1 9	1 9	1 10			24
25	4 20	3 35	3 4	2 39	2 21	2 7	1 56	1 40	1 28	1 21	1 16	1 13	1 10	1 8	1 8	1 9			25
26	4 30	3 44	3 12	2 45	2 27	2 12	2 0	1 43	1 30	1 22	1 17	1 13	1 10	1 8	1 8	1 9			26
27	4 41	3 53	3 20	2 52	2 33	2 17	2 4	1 47	1 33	1 24	1 18	1 14	1 11	1 8	1 7	1 8			27
28	4 51	4 2	3 28	2 59	2 39	2 23	2 8	1 50	1 35	1 25	1 19	1 14	1 11	1 8	1 7	1 7			28
29	5 1	4 11	3 36	3 6	2 45	2 28	2 12	1 53	1 38	1 27	1 20	1 15	1 12	1 9	1 7	1 7			29
30	5 12	4 20	3 44	3 13	2 50	2 33	2 17	1 56	1 40	1 29	1 21	1 15	1 12	1 9	1 7	1 6			30
31	5 23	4 29	3 52	3 20	2 56	2 38	2 21	2 0	1 43	1 30	1 22	1 16	1 12	1 9	1 7	1 6			31
32	5 33	4 38	3 59	3 27	3 1	2 43	2 26	2 3	1 45	1 32	1 23	1 17	1 13	1 10	1 7	1 6			32
33	5 43	4 46	4 6	3 33	3 7	2 48	2 30	2 6	1 47	1 34	1 24	1 18	1 14	1 10	1 8	1 6			33
34	5 52	4 54	4 13	3 39	3 13	2 53	2 34	2 9	1 49	1 36	1 26	1 19	1 15	1 11	1 8	1 6			34
35	6 1	5 2	4 20	3 45	3 19	2 58	2 38	2 12	1 51	1 38	1 27	1 20	1 15	1 11	1 8	1 6			35
36	6 10	5 10	4 26	3 51	3 24	3 2	2 42	2 15	1 54	1 40	1 29	1 22	1 16	1 12	1 8	1 6			36
37	6 18	5 17	4 32	3 57	3 29	3 7	2 46	2 18	1 57	1 42	1 31	1 23	1 17	1 12	1 9	1 7			37
38	6 26	5 24	4 38	4 3	3 33	3 11	2 50	2 21	2 0	1 44	1 33	1 25	1 18	1 13	1 9	1 7			38
39	6 34	5 31	4 44	4 8	3 38	3 15	2 54	2 24	2 2	1 46	1 35	1 26	1 19	1 14	1 10	1 7			39
40	6 42	5 38	4 50	4 13	3 42	3 19	2 58	2 27	2 5	1 48	1 37	1 28	1 20	1 14	1 10	1 7			40
41	6 50	5 45	4 56	4 19	3 47	3 24	3 2	2 30	2 8	1 51	1 39	1 29	1 21	1 15	1 11	1 8			41
42	6 58	5 52	5 2	4 24	3 51	3 28	3 6	2 33	2 10	1 53	1 41	1 30	1 22	1 16	1 11	1 8			42
43	7 7	5 59	5 8	4 29	3 56	3 32	3 10	2 36	2 13	1 55	1 43	1 32	1 23	1 17	1 12	1 9			43
44	7 16	6 6	5 14	4 34	4 0	3 36	3 13	2 39	2 15	1 57	1 44	1 33	1 24	1 18	1 13	1 9			44
46	7 33	6 21	5 26	4 44	4 9	3 44	3 20	2 44	2 19	2 1	1 47	1 35	1 27	1 20	1 14	1 10			46
48	7 50	6 35	5 38	4 54	4 18	3 51	3 27	2 49	2 23	2 5	1 50	1 37	1 29	1 22	1 15	1 11			48
50			5 50	5 3	4 27	3 58	3 33	2 54	2 27	2 8	1 52	1 39	1 31	1 23	1 17	1 12			50
52					4 36	4 5	3 39	2 59	2 31	2 11	1 54	1 42	1 32	1 24	1 18	1 13			52
54							3 45	3 4	2 35	2 14	1 56	1 44	1 34	1 26	1 19	1 14			54
56								3 9	2 39	2 17	1 58	1 46	1 36	1 28	1 20	1 14			56
									2 43	2 19	2 0	1 48	1 37	1 29	1 21	1 15			58
										2 21	2 2	1 49	1 38	1 30	1 22	1 15			60
											2 4	1 50	1 39	1 30	1 22	1 16			62
												1 51	1 40	1 31	1 23	1 16			64
													1 40	1 31	1 24	1 17			66
														1 31	1 24	1 17			68
															1 24	1 17			70
																1 17			72
																			74
																			76
																			78
																			80
																			82
																			84
																			86
							11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°		

TABLE P. EFFECT OF SUN's PAR.

Add the Numbers above the lines to 3rd Correction, subtract the others.

D's App Alt.	Sun's Apparent Altitude.									
	5°	10°	20°	30°	40°	50°	60°	70°	80°	90°
	′	′	′	′	′	′	′	′	′	′
5	0	1	2	4	6					
10	1	0	1	3	4	6				
20	4	3	1	1	3	3	4			
30	6	5	3	2	0	1	2	3		
40	8	7	5	4	2	1	0	1	2	
50		9	7	5	4	2	1	0	0	0
60			9	7	5	4	3	2	2	
70				8	6	5	4	3		
80					7	6	4			
90						6				

TABLE XVIII.

Third Correction, to Apparent Distance 40°.

D's App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.															D's App Alt.
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	5 19	5 39	5 59	6 19	6 57	7 33											6
7	4 27	4 44	5 1	5 18	5 51	6 20											7
8	3 51	4 6	4 20	4 34	5 1	5 26	5 50										8
9	3 20	3 34	3 46	3 58	4 22	4 44	5 5										9
10	2 56	3 8	3 19	3 30	3 50	4 9	4 27										10
11	2 37	2 47	2 57	3 6	3 25	3 42	3 58										11
12	2 22	2 30	2 39	2 48	3 5	3 20	3 33	3 46									12
13	2 10	2 17	2 25	2 32	2 47	3 1	3 13	3 25									13
14	2 0	2 6	2 12	2 18	2 32	2 44	2 55	3 4									14
15	1 50	1 56	2 1	2 7	2 19	2 30	2 40	2 48									15
16	1 42	1 47	1 52	1 58	2 8	2 18	2 27	2 35	2 42								16
17	1 36	1 40	1 45	1 50	1 59	2 8	2 16	2 23	2 30								17
18	1 31	1 34	1 38	1 43	1 51	1 59	2 6	2 12	2 19								18
19	1 26	1 29	1 33	1 36	1 44	1 51	1 58	2 3	2 9								19
20	1 22	1 24	1 27	1 30	1 37	1 44	1 50	1 55	2 0	2 5							20
21	1 18	1 20	1 23	1 26	1 32	1 38	1 44	1 49	1 53	1 57							21
22	1 15	1 17	1 19	1 22	1 28	1 33	1 38	1 43	1 47	1 50							22
23	1 13	1 14	1 16	1 19	1 24	1 29	1 33	1 38	1 42	1 45							23
24	1 11	1 12	1 14	1 16	1 21	1 25	1 29	1 33	1 37	1 40	1 43						24
25	1 10	1 11	1 12	1 14	1 18	1 21	1 25	1 29	1 32	1 35	1 37						25
26	1 9	1 10	1 11	1 12	1 15	1 18	1 21	1 25	1 28	1 30	1 32						26
27	1 8	1 9	1 9	1 10	1 13	1 15	1 18	1 21	1 24	1 26	1 27						27
28	1 7	1 8	1 8	1 9	1 11	1 13	1 16	1 18	1 20	1 22	1 23	1 24					28
29	1 7	1 7	1 7	1 8	1 9	1 11	1 13	1 15	1 16	1 18	1 19	1 20					29
30	1 6	1 6	1 6	1 7	1 8	1 9	1 11	1 12	1 13	1 15	1 16	1 17					30
31	1 6	1 6	1 6	1 7	1 7	1 8	1 9	1 10	1 11	1 13	1 14	1 15					31
32	1 6	1 6	1 6	1 6	1 6	1 6	1 7	1 8	1 9	1 10	1 11	1 12	1 13				32
33	1 5	1 5	1 5	1 5	1 5	1 5	1 6	1 6	1 7	1 8	1 9	1 10	1 11				33
34	1 5	1 4	1 4	1 4	1 4	1 4	1 5	1 5	1 6	1 7	1 7	1 8	1 8				34
35	1 5	1 4	1 4	1 4	1 4	1 4	1 4	1 4	1 4	1 5	1 5	1 6	1 6				35
36	1 5	1 4	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 4	1 4	1 4	1 4	1 4			36
37	1 5	1 4	1 3	1 2	1 2	1 2	1 2	1 1	1 1	1 2	1 2	1 2	1 2	1 2			37
38	1 5	1 4	1 2	1 1	1 1	1 1	1 1	1 0	1 0	1 0	1 1	1 1	1 1	1 1			38
39	1 5	1 4	1 2	1 1	1 0	1 0	1 0	59	59	59	59	59	59	59			39
40	1 5	1 4	1 2	1 1	1 0	59	59	58	58	57	57	57	57	57	57		40
41	1 6	1 4	1 2	1 1	59	58	58	57	57	56	56	56	56	56	56		41
42	1 6	1 4	1 2	1 0	58	57	57	56	56	55	55	55	55	55	55		42
43	1 6	1 4	1 2	1 0	58	57	56	55	55	54	54	54	54	54	54	54	43
44	1 6	1 4	1 2	1 0	58	56	55	54	54	53	53	53	53	53	53	53	44
46	1 7	1 4	1 2	1 0	58	56	54	53	53	52	52	51	51	51	51	51	46
48	1 8	1 5	1 2	1 0	58	55	53	52	52	51	51	50	49	49	49	49	48
50	1 8	1 5	1 2	1 0	57	54	52	51	51	50	49	48	48	48	48	48	50
52	1 9	1 5	1 2	1 0	57	54	52	50	50	49	48	47	47	46	46	46	52
54	1 9	1 5	1 2	1 0	57	54	51	49	49	48	47	46	46	45	45	45	54
56	1 10	1 6	1 3	1 0	56	53	51	49	48	47	46	45	45	44	44	44	56
58	1 10	1 6	1 3	1 0	56	53	50	48	47	46	45	45	44	43	43		58
60	1 10	1 7	1 4	1 1	56	52	50	48	47	45	44	44	43	42	42		60
62	1 11	1 7	1 4	1 1	56	52	50	48	46	45	44	43	42	42			62
64	1 11	1 7	1 4	1 1	56	52	49	47	45	44	43	42	41	41			64
66	1 12	1 7	1 4	1 1	56	52	49	47	45	43	42	42	41				66
68	1 12	1 8	1 4	1 1	56	52	49	47	45	43	42	42	41				68
70	1 12	1 8	1 4	1 1	55	51	48	46	44	43	42	42					70
72	1 13	1 8	1 4	1 1	55	51	48	46	44	43	42	41					72
74	1 13	1 8	1 4	1 1	55	51	48	46	44	43	42						74
76		1 8	1 4	1 1	55	51	48	46	44	42	41						76
78			1 4	1 1	55	51	48	46	43	42							78
80				1 1	55	51	48	46	43	41							80
82					55	51	48	46	43								82
84					55	51	48	46	43								84
86						51	48	45									86
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°	

TABLE XVIII.

Third Correction, to Apparent Distance 44°.

D's App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																		D's App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°			
○	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″			○
6	1 16	1 18	1 21	1 25	1 31	1 37	1 45	2 3	2 23	2 44	3 5	3 25	3 45	4 5	4 25	4 44			6
7	1 20	1 16	1 18	1 20	1 24	1 28	1 33	1 46	2 1	2 17	2 34	2 51	3 8	3 25	3 42	3 59			7
8	1 25	1 19	1 16	1 17	1 19	1 22	1 25	1 35	1 47	2 0	2 14	2 29	2 43	2 58	3 12	3 27			8
9	1 31	1 23	1 18	1 15	1 16	1 18	1 21	1 27	1 36	1 47	1 59	2 12	2 24	2 36	2 48	3 0			9
10	1 39	1 28	1 21	1 17	1 15	1 16	1 18	1 22	1 29	1 38	1 48	1 58	2 8	2 18	2 29	2 39			10
11	1 48	1 34	1 25	1 20	1 17	1 15	1 16	1 19	1 24	1 31	1 39	1 47	1 56	2 5	2 14	2 24			11
12	1 58	1 41	1 30	1 23	1 19	1 16	1 15	1 17	1 20	1 25	1 32	1 38	1 46	1 54	2 2	2 11			12
13	2 8	1 48	1 35	1 27	1 22	1 18	1 16	1 15	1 17	1 21	1 26	1 32	1 38	1 45	1 52	1 59			13
14	2 18	1 56	1 41	1 31	1 25	1 20	1 17	1 14	1 15	1 18	1 22	1 27	1 32	1 38	1 44	1 49			14
15	2 28	2 4	1 47	1 36	1 29	1 23	1 19	1 15	1 14	1 16	1 19	1 23	1 27	1 32	1 37	1 42			15
16	2 38	2 12	1 53	1 41	1 33	1 26	1 21	1 17	1 14	1 15	1 17	1 20	1 23	1 27	1 32	1 36			16
17	2 48	2 20	2 0	1 47	1 37	1 30	1 24	1 19	1 15	1 15	1 16	1 18	1 20	1 23	1 26	1 30			17
18	2 58	2 28	2 8	1 53	1 42	1 34	1 27	1 20	1 16	1 14	1 15	1 16	1 18	1 20	1 22	1 25			18
19	3 8	2 37	2 15	1 59	1 47	1 38	1 30	1 22	1 17	1 14	1 14	1 15	1 16	1 17	1 19	1 22			19
20	3 18	2 45	2 22	2 5	1 52	1 42	1 34	1 25	1 19	1 15	1 13	1 14	1 14	1 15	1 17	1 19			20
21	3 29	2 54	2 30	2 12	1 57	1 46	1 37	1 27	1 21	1 17	1 14	1 12	1 13	1 14	1 15	1 17			21
22	3 39	3 2	2 37	2 18	2 3	1 51	1 41	1 30	1 23	1 18	1 14	1 11	1 12	1 13	1 14	1 16			22
23	3 49	3 11	2 45	2 24	2 8	1 55	1 45	1 33	1 25	1 19	1 15	1 12	1 11	1 12	1 13	1 14			23
24	4 0	3 19	2 52	2 31	2 14	2 0	1 49	1 36	1 27	1 20	1 16	1 12	1 10	1 10	1 11	1 13			24
25	4 10	3 28	2 59	2 37	2 20	2 5	1 53	1 39	1 29	1 21	1 17	1 13	1 10	1 9	1 10	1 11			25
26	4 20	3 36	3 6	2 43	2 25	2 10	1 57	1 42	1 31	1 22	1 17	1 13	1 10	1 8	1 9	1 9			26
27	4 30	3 45	3 13	2 49	2 31	2 15	2 1	1 45	1 32	1 23	1 18	1 14	1 11	1 9	1 8	1 8			27
28	4 39	3 53	3 20	2 55	2 36	2 20	2 5	1 47	1 34	1 25	1 19	1 15	1 12	1 9	1 7	1 7			28
29	4 48	4 1	3 27	3 1	2 41	2 24	2 9	1 49	1 36	1 27	1 20	1 15	1 12	1 9	1 7	1 6			29
30	4 57	4 9	3 34	3 7	2 46	2 29	2 14	1 52	1 38	1 28	1 21	1 16	1 13	1 9	1 7	1 6			30
31	5 7	4 17	3 41	3 13	2 51	2 34	2 19	1 55	1 40	1 30	1 22	1 17	1 13	1 10	1 8	1 6			31
32	5 16	4 25	3 48	3 19	2 56	2 38	2 23	1 58	1 42	1 31	1 23	1 18	1 14	1 10	1 8	1 6			32
33	5 25	4 33	3 54	3 25	3 1	2 43	2 27	2 1	1 44	1 33	1 24	1 19	1 15	1 11	1 9	1 7			33
34	5 34	4 40	4 1	3 30	3 6	2 47	2 31	2 4	1 47	1 35	1 26	1 20	1 15	1 11	1 9	1 7			34
35	5 43	4 48	4 8	3 36	3 11	2 52	2 35	2 7	1 50	1 37	1 27	1 21	1 16	1 12	1 9	1 7			35
36	5 51	4 55	4 14	3 42	3 15	2 56	2 39	2 11	1 53	1 39	1 28	1 22	1 17	1 13	1 10	1 7			36
37	6 0	5 3	4 21	3 47	3 20	3 0	2 43	2 15	1 56	1 41	1 30	1 23	1 17	1 13	1 10	1 8			37
38	6 9	5 10	4 27	3 52	3 24	3 4	2 47	2 18	1 58	1 43	1 32	1 24	1 18	1 14	1 11	1 8			38
39	6 18	5 18	4 33	3 58	3 29	3 8	2 51	2 21	2 1	1 45	1 33	1 25	1 19	1 14	1 11	1 8			39
40	6 27	5 25	4 39	4 3	3 33	3 12	2 54	2 24	2 3	1 46	1 35	1 26	1 20	1 15	1 11	1 8			40
41	6 36	5 32	4 45	4 8	3 38	3 16	2 58	2 27	2 6	1 48	1 37	1 27	1 21	1 16	1 12	1 9			41
42	6 45	5 39	4 51	4 13	3 42	3 20	3 1	2 30	2 8	1 50	1 39	1 29	1 22	1 16	1 12	1 9			42
43	6 53	5 46	4 57	4 18	3 47	3 24	3 4	2 33	2 10	1 52	1 40	1 30	1 23	1 17	1 13	1 9			43
44	7 0	5 53	5 5	4 23	3 51	3 28	3 7	2 35	2 12	1 54	1 42	1 32	1 24	1 18	1 13	1 10			44
46	7 14	6 6	5 14	4 33	4 0	3 35	3 14	2 40	2 17	1 58	1 45	1 35	1 26	1 20	1 14	1 10			46
48	7 27	6 18	5 25	4 43	4 9	3 43	3 21	2 45	2 21	2 1	1 48	1 37	1 28	1 21	1 15	1 11			48
50	7 40	6 29	5 35	4 52	4 18	3 50	3 27	2 50	2 25	2 6	1 52	1 40	1 31	1 23	1 16	1 11			50
52	7 52	6 40	5 45	5 1	4 26	3 57	3 33	2 55	2 29	2 10	1 56	1 43	1 33	1 25	1 18	1 12			52
54			5 55	5 9	4 34	4 4	3 39	3 0	2 33	2 14	1 59	1 46	1 35	1 26	1 19	1 13			54
56					4 42	4 10	3 45	3 5	2 37	2 17	2 2	1 49	1 37	1 27	1 20	1 14			56
							3 50	3 10	2 41	2 20	2 4	1 51	1 39	1 29	1 21	1 15			58
								3 14	2 44	2 22	2 5	1 52	1 40	1 30	1 22	1 16			60
									2 47	2 24	2 6	1 53	1 42	1 31	1 23	1 17			62
										2 26	2 7	1 54	1 43	1 32	1 24	1 18			64
											2 8	1 55	1 44	1 33	1 25	1 19			66
												1 56	1 45	1 34	1 26	1 20			68
													1 45	1 35	1 27	1 21			70
														1 36	1 29	1 22			72
															1 30	1 22			74
																1 23			76
																			78
																			80
																			82
																			84
																			86
						11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°			

TABLE P. EFFECT OF SUN's PAR.

Add the Numbers above the lines to 3rd Correction, subtract the others.

D's App Alt.	Sun's Apparent Altitude.								
	5 ″	10 ″	20 ″	30 ″	40 ″	50 ″	60 ″	70 ″	80 ″	90 ″
5	0	1	2	4	5	6				
10	1	0	1	2	4	5				
20	3	3	1	0	2	3	4			
30	5	5	3	2	0	1	2	2		
40	7	7	5	4	2	1	0	0	1	
50	9	8	7	5	4	3	2	1	1	
60			8	7	5	4	3	2	2	
70				9	7	5	4	3		
80					9	7	6			

Third Correction, to Apparent Distance 44°.

D's App Alt.	Apparent Altitude of the Sun, or Star.																D's App Alt.
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	5 35	22 5 41	5 59	6 36	7 10	7 40											6
7	4 15	4 31	4 47	5 25	33 6	1 6	29										7
8	3 40	3 53	4 6	4 20	4 46	5 11	5 35	5 58									8
9	3 12	3 24	3 35	3 47	4 10	4 31	4 51	5 10									9
10	2 50	3 0	3 10	3 20	3 39	3 58	4 17	4 34									10
11	2 33	2 42	2 52	3 0	3 17	3 33	3 48	4 3									11
12	2 19	2 27	2 36	2 44	2 59	3 13	3 26	3 39	3 51								12
13	2 6	2 13	2 21	2 29	2 43	2 56	3 9	3 20	3 29								13
14	1 55	2 2	2 9	2 16	2 29	2 41	2 53	3 3	3 10								14
15	1 47	1 53	1 59	2 5	2 17	2 28	2 38	2 47	2 54								15
16	1 40	1 45	1 50	1 56	2 7	2 17	2 26	2 34	2 41	2 47							16
17	1 34	1 38	1 43	1 48	1 58	2 7	2 15	2 22	2 29	2 35							17
18	1 29	1 33	1 37	1 42	1 51	1 59	2 6	2 12	2 18	2 24							18
19	1 25	1 28	1 32	1 36	1 44	1 52	1 59	2 4	2 9	2 14							19
20	1 22	1 25	1 28	1 31	1 38	1 46	1 52	1 57	2 1	2 6	2 11						20
21	1 19	1 22	1 25	1 27	1 33	1 40	1 46	1 51	1 55	1 59	2 2						21
22	1 17	1 19	1 22	1 24	1 29	1 35	1 40	1 45	1 49	1 53	1 55						22
23	1 15	1 17	1 19	1 21	1 25	1 30	1 35	1 40	1 44	1 47	1 49						23
24	1 14	1 15	1 16	1 18	1 22	1 26	1 30	1 35	1 39	1 42	1 44	1 46					24
25	1 12	1 13	1 14	1 16	1 19	1 22	1 26	1 30	1 34	1 37	1 39	1 40					25
26	1 10	1 11	1 12	1 14	1 16	1 19	1 22	1 26	1 30	1 32	1 34	1 35					26
27	1 9	1 10	1 11	1 12	1 14	1 16	1 19	1 23	1 26	1 28	1 30	1 31					27
28	1 8	1 9	1 10	1 11	1 12	1 14	1 17	1 20	1 22	1 24	1 26	1 27	1 28				28
29	1 7	1 8	1 8	1 9	1 10	1 12	1 15	1 17	1 19	1 21	1 22	1 23	1 25				29
30	1 6	1 7	1 7	1 8	1 9	1 10	1 12	1 14	1 16	1 18	1 19	1 20	1 22				30
31	1 6	1 6	1 6	1 7	1 8	1 8	1 10	1 12	1 14	1 15	1 17	1 18	1 19				31
32	1 5	1 6	1 6	1 6	1 7	1 7	1 8	1 10	1 12	1 13	1 14	1 15	1 16	1 17			32
33	1 5	1 5	1 5	1 5	1 6	1 6	1 7	1 8	1 9	1 10	1 11	1 12	1 13	1 14			33
34	1 5	1 4	1 4	1 4	1 5	1 5	1 6	1 6	1 7	1 8	1 9	1 10	1 11	1 12			34
35	1 5	1 4	1 4	1 4	1 4	1 4	1 5	1 5	1 5	1 6	1 7	1 8	1 9	1 10			35
36	1 5	1 4	1 3	1 3	1 3	1 3	1 4	1 4	1 4	1 5	1 5	1 6	1 7	1 8	1 9		36
37	1 6	1 4	1 3	1 2	1 2	1 2	1 3	1 3	1 3	1 4	1 4	1 5	1 5	1 6	1 7		37
38	1 6	1 4	1 2	1 1	1 1	1 1	1 2	1 2	1 2	1 3	1 3	1 4	1 4	1 4	1 5		38
39	1 6	1 4	1 2	1 1	1 0	1 0	1 1	1 1	1 1	1 2	1 2	1 3	1 3	1 3	1 4		39
40	1 6	1 4	1 2	1 1	1 0	1 0	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	2	1 3	40
41	1 7	1 5	1 3	1 1	1 0	1 0	1 0	1 0	1 0	1 0	1 0	1 0	1 0	1 0	1 0	1 1	41
42	1 7	1 5	1 3	1 1	59	59	59	59	59	59	59	59	59	59	59	59	42
43	1 7	1 5	1 3	1 1	59	59	58	58	58	58	58	58	58	58	58	58	43
44	1 7	1 5	1 3	1 1	59	58	57	57	57	57	57	57	57	57	57	57	44
46	1 7	1 5	1 3	1 1	59	57	56	56	56	56	55	55	55	55	55	55	46
48	1 8	1 6	1 4	1 2	59	57	55	55	55	54	54	54	53	53	53	53	48
50	1 8	1 6	1 4	1 2	59	57	55	54	54	53	53	53	52	52	52	52	50
52	1 9	1 6	1 4	1 2	59	56	54	53	53	52	52	51	51	51	50	51	52
54	1 10	1 7	1 4	1 2	59	56	54	53	52	51	51	50	50	49	49		54
56	1 10	1 7	1 5	1 2	59	56	54	52	51	50	50	49	49	48	47		56
58	1 11	1 8	1 5	1 3	59	56	53	51	50	49	49	48	48	47			58
60	1 11	1 8	1 5	1 3	59	56	53	51	50	49	48	47	47	46			60
62	1 12	1 9	1 6	1 3	59	56	53	51	49	48	47	47	46				62
64	1 13	1 9	1 6	1 3	59	56	53	51	49	48	47	46	45				64
66	1 14	1 10	1 7	1 4	59	56	53	51	49	48	47	46					66
68	1 15	1 11	1 7	1 4	59	56	53	51	49	47	46	45					68
70	1 16	1 11	1 7	1 4	59	55	53	51	49	47	46						70
72	1 16	1 12	1 8	1 4	59	55	52	50	48	46	45						72
74	1 16	1 12	1 8	1 4	59	55	52	50	48	46							74
76	1 17	1 12	1 8	1 5	59	55	52	49	47	46							76
78	1 17	1 12	1 8	1 5	59	55	52	49	47								78
80		1 12	1 8	1 5	59	55	52	49	47								80
82			1 8	1 5	59	55	52	49									82
84				1 5	59	55	52	49									84
86					59	55	52										86
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°	

TABLE XVIII

Third Correction, to Apparent Distance 45°.

☽'s App Alt	APPARENT ALTITUDE OF THE SUN, OR STAR.																		☽'s App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°			
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″			°
6	1 16	1 17	1 19	1 23	1 29	1 36	1 43	2 1	2 20	2 39	2 58	3 16	3 35	3 54	4 13	4 32			6
7	1 19	1 16	1 17	1 19	1 23	1 28	1 33	1 46	2 0	2 16	2 32	2 47	3 2	3 18	3 34	3 50			7
8	1 24	1 19	1 16	1 17	1 19	1 22	1 26	1 35	1 47	1 59	2 12	2 25	2 39	2 53	3 7	3 21			8
9	1 30	1 23	1 18	1 16	1 17	1 19	1 21	1 28	1 37	1 47	1 58	2 9	2 20	2 32	2 44	2 55			9
10	1 37	1 27	1 21	1 18	1 16	1 17	1 18	1 23	1 30	1 38	1 47	1 56	2 6	2 16	2 26	2 36			10
11	1 45	1 33	1 25	1 21	1 18	1 16	1 17	1 20	1 25	1 32	1 39	1 47	1 55	2 4	2 13	2 22			11
12	1 53	1 39	1 30	1 24	1 21	1 18	1 16	1 19	1 22	1 27	1 33	1 40	1 47	1 54	2 2	2 10			12
13	2 2	1 46	1 36	1 28	1 24	1 20	1 18	1 17	1 19	1 23	1 28	1 34	1 40	1 46	1 53	2 0			13
14	2 11	1 54	1 42	1 33	1 27	1 23	1 20	1 16	1 17	1 20	1 24	1 29	1 34	1 39	1 45	1 51			14
15	2 20	2 1	1 48	1 37	1 30	1 26	1 22	1 17	1 16	1 18	1 21	1 24	1 29	1 33	1 38	1 43			15
16	2 30	2 9	1 54	1 42	1 34	1 29	1 24	1 18	1 16	1 17	1 18	1 20	1 24	1 28	1 32	1 37			16
17	2 40	2 17	2 0	1 47	1 38	1 32	1 27	1 20	1 17	1 16	1 17	1 18	1 21	1 25	1 28	1 32			17
18	2 50	2 25	2 7	1 52	1 42	1 35	1 30	1 22	1 18	1 15	1 16	1 17	1 19	1 22	1 25	1 28			18
19	3 0	2 32	2 14	1 58	1 46	1 39	1 33	1 24	1 19	1 16	1 15	1 16	1 17	1 19	1 22	1 24			19
20	3 9	2 40	2 20	2 3	1 51	1 43	1 36	1 27	1 21	1 17	1 14	1 15	1 16	1 17	1 19	1 21			20
21	3 18	2 48	2 26	2 9	1 56	1 47	1 40	1 30	1 23	1 18	1 15	1 14	1 15	1 16	1 17	1 19			21
22	3 27	2 56	2 33	2 15	2 2	1 52	1 43	1 32	1 24	1 19	1 16	1 13	1 14	1 15	1 16	1 18			22
23	3 37	3 3	2 40	2 21	2 7	1 56	1 46	1 35	1 26	1 20	1 16	1 14	1 13	1 14	1 15	1 16			23
24	3 46	3 11	2 47	2 26	2 12	2 0	1 50	1 37	1 27	1 21	1 17	1 14	1 12	1 13	1 13	1 14			24
25	3 56	3 19	2 54	2 32	2 17	2 5	1 54	1 40	1 29	1 22	1 18	1 15	1 13	1 12	1 12	1 13			25
26	4 5	3 27	3 1	2 38	2 22	2 9	1 58	1 42	1 31	1 24	1 19	1 16	1 13	1 11	1 11	1 12			26
27	4 15	3 34	3 8	2 44	2 27	2 14	2 2	1 44	1 33	1 25	1 20	1 16	1 13	1 11	1 10	1 11			27
28	4 24	3 42	3 15	2 50	2 32	2 18	2 6	1 47	1 35	1 27	1 21	1 17	1 14	1 12	1 10	1 10			28
29	4 33	3 50	3 21	2 56	2 37	2 23	2 10	1 50	1 37	1 28	1 22	1 18	1 15	1 12	1 10	1 9			29
30	4 42	3 58	3 28	3 2	2 42	2 27	2 13	1 53	1 40	1 30	1 23	1 19	1 15	1 12	1 10	1 9			30
31	4 51	4 6	3 35	3 8	2 47	2 31	2 17	1 57	1 42	1 32	1 25	1 20	1 16	1 13	1 11	1 9			31
32	5 0	4 13	3 42	3 14	2 52	2 35	2 20	2 0	1 44	1 33	1 26	1 21	1 16	1 13	1 11	1 9			32
33	5 9	4 21	3 49	3 20	2 57	2 39	2 23	2 3	1 46	1 35	1 27	1 22	1 17	1 14	1 12	1 10			33
34	5 18	4 28	3 55	3 25	3 2	2 44	2 27	2 6	1 49	1 37	1 28	1 23	1 18	1 14	1 12	1 10			34
35	5 27	4 36	4 1	3 31	3 7	2 48	2 31	2 9	1 52	1 39	1 30	1 24	1 19	1 15	1 12	1 10			35
36	5 35	4 43	4 8	3 37	3 12	2 52	2 35	2 12	1 54	1 41	1 31	1 25	1 19	1 15	1 12	1 10			36
37	5 44	4 50	4 14	3 42	3 17	2 57	2 39	2 16	1 56	1 43	1 33	1 26	1 20	1 16	1 13	1 11			37
38	5 52	4 57	4 20	3 47	3 22	3 1	2 43	2 19	1 59	1 45	1 34	1 27	1 21	1 17	1 14	1 11			38
39	6 0	5 4	4 26	3 53	3 26	3 5	2 47	2 22	2 1	1 47	1 35	1 28	1 22	1 17	1 14	1 11			39
40	6 8	5 11	4 32	3 58	3 30	3 10	2 51	2 25	2 5	1 49	1 37	1 29	1 23	1 18	1 15	1 12			40
41	6 16	5 18	4 38	4 3	3 35	3 14	2 55	2 28	2 7	1 51	1 39	1 31	1 24	1 19	1 16	1 13			41
42	6 24	5 24	4 44	4 8	3 40	3 18	2 58	2 31	2 10	1 53	1 41	1 33	1 26	1 20	1 16	1 13			42
43	6 32	5 31	4 50	4 13	3 44	3 22	3 2	2 33	2 12	1 55	1 43	1 34	1 27	1 21	1 17	1 14			43
44	6 39	5 37	4 55	4 18	3 48	3 26	3 5	2 36	2 14	1 57	1 45	1 36	1 28	1 22	1 18	1 15			44
46	6 53	5 49	5 5	4 28	3 56	3 34	3 12	2 41	2 18	2 1	1 48	1 38	1 30	1 23	1 18	1 15			46
48	7 7	6 1	5 15	4 37	4 4	3 41	3 18	2 46	2 22	2 5	1 51	1 40	1 31	1 24	1 19	1 16			48
50	7 21	6 13	5 25	4 46	4 12	3 47	3 24	2 51	2 26	2 8	1 53	1 42	1 33	1 25	1 20	1 16			50
52	7 34	6 24	5 34	4 54	4 20	3 53	3 30	2 56	2 30	2 12	1 56	1 44	1 35	1 27	1 22	1 17			52
54	7 47	6 35	5 43	5 1	4 27	3 59	3 36	3 1	2 34	2 15	1 59	1 46	1 37	1 29	1 23	1 19			54
56	8 0	6 46	5 51	5 8	4 34	4 5	3 41	3 6	2 38	2 18	2 1	1 49	1 39	1 31	1 25	1 20			56
58			5 59	5 15	4 40	4 11	3 46	3 10	2 42	2 21	2 4	1 51	1 41	1 32	1 26	1 21			58
					4 46	4 16	3 50	3 13	2 45	2 23	2 6	1 53	1 42	1 33	1 27	1 21			60
							3 54	3 15	2 47	2 25	2 8	1 54	1 43	1 34	1 28	1 22			62
								3 17	2 49	2 27	2 10	1 56	1 45	1 35	1 28	1 22			64
									2 51	2 29	2 11	1 57	1 46	1 36	1 29	1 23			66
										2 31	2 12	1 58	1 47	1 37	1 30	1 24			68
											2 13	1 59	1 48	1 38	1 30	1 24			70
												2 0	1 49	1 39	1 31	1 24			72
													1 50	1 40	1 32	1 25			74
														1 41	1 33	1 25			76
															1 33	1 26			78
																1 26			80
																			82
																			84
																			86
							11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°		

TABLE P. EFFECT OF SUN'S PAR.

Add the Numbers above the lines to 3rd Correction, subtract the others.

☽'s App Alt.	Sun's Apparent Altitude.									
	5	10	20	30	40	50	60	70	80	90
	″	″	″	″	′	′	″	″	″	′
5	0	1	2	3	4	5				
10	1	1	1	2	3	4	5			
20	2	2	1	0	1	2	3	3		
30	3	3	3	2	1	0	1	2		
40	7	6	5	4	3	2	1	0	0	0
50	9	9	6	5	4	3	2	2	1	
60		9	8	6	5	4	3	3		
70			9	7	6	5	4			
80				8	7	6				
90					7					

TABLE XVIII.

THIRD CORRECTION, to APPARENT DISTANCE 48°.

D's App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																		D's App Alt.
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°			
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″			°
6	4 51	5 10	5 28	5 46	6 18	6 49	7 19	7 47											6
7	4 6	4 21	4 36	4 51	5 19	5 45	6 11	6 35											7
8	3 34	3 48	4 1	4 14	4 38	5 1	5 22	5 42	6 1										8
9	3 7	3 19	3 30	3 41	4 3	4 24	4 43	5 0	5 17										9
10	2 47	2 57	3 7	3 17	3 36	3 54	4 11	4 26	4 40										10
11	2 31	2 40	2 49	2 57	3 14	3 30	3 44	3 57	4 10										11
12	2 17	2 25	2 33	2 40	2 55	3 9	3 22	3 34	3 45	3 55									12
13	2 6	2 13	2 20	2 27	2 40	2 52	3 4	3 15	3 25	3 32									13
14	1 57	2 4	2 10	2 16	2 27	2 38	2 49	2 59	3 8	3 15									14
15	1 49	1 55	2 1	2 6	2 16	2 26	2 35	2 44	2 53	3 0									15
16	1 42	1 47	1 52	1 57	2 7	2 15	2 23	2 32	2 40	2 46	2 52								16
17	1 36	1 41	1 45	1 50	1 59	2 6	2 14	2 22	2 29	2 34	2 40								17
18	1 31	1 35	1 39	1 43	1 51	1 59	2 6	2 13	2 19	2 24	2 29								18
19	1 27	1 31	1 34	1 38	1 45	1 52	1 58	2 4	2 10	2 15	2 19								19
20	1 24	1 27	1 30	1 33	1 39	1 45	1 51	1 57	2 2	2 7	2 11	2 15							20
21	1 22	1 24	1 27	1 29	1 34	1 40	1 45	1 51	1 56	2 0	2 4	2 7							21
22	1 20	1 22	1 24	1 26	1 30	1 35	1 40	1 45	1 50	1 54	1 57	1 59							22
23	1 18	1 19	1 21	1 23	1 27	1 31	1 36	1 40	1 45	1 49	1 51	1 53							23
24	1 16	1 17	1 19	1 21	1 25	1 28	1 32	1 36	1 40	1 44	1 46	1 48	1 50						24
25	1 14	1 15	1 16	1 18	1 22	1 25	1 29	1 32	1 36	1 39	1 41	1 43	1 45						25
26	1 12	1 13	1 14	1 16	1 19	1 23	1 26	1 29	1 32	1 34	1 36	1 38	1 40						26
27	1 11	1 12	1 13	1 14	1 17	1 20	1 23	1 26	1 28	1 30	1 32	1 34	1 36						27
28	1 10	1 11	1 12	1 13	1 15	1 18	1 20	1 23	1 25	1 27	1 28	1 30	1 32	1 34					28
29	1 9	1 10	1 11	1 12	1 14	1 16	1 18	1 20	1 22	1 24	1 25	1 27	1 28	1 30					29
30	1 9	1 10	1 10	1 11	1 12	1 14	1 16	1 18	1 19	1 21	1 22	1 24	1 25	1 26					30
31	1 9	1 9	1 9	1 10	1 11	1 12	1 14	1 16	1 17	1 19	1 20	1 21	1 22	1 23					31
32	1 8	1 8	1 8	1 9	1 10	1 11	1 13	1 14	1 15	1 17	1 18	1 19	1 19	1 20	1 21				32
33	1 8	1 7	1 7	1 8	1 9	1 10	1 11	1 12	1 13	1 15	1 16	1 17	1 17	1 17	1 18				33
34	1 8	1 6	1 6	1 7	1 8	1 9	1 10	1 11	1 12	1 13	1 14	1 14	1 15	1 15	1 16				34
35	1 8	1 6	1 5	1 6	1 7	1 8	1 9	1 9	1 10	1 11	1 12	1 12	1 13	1 13	1 14				35
36	1 8	1 6	1 5	1 5	1 5	1 6	1 7	1 7	1 8	1 9	1 10	1 10	1 11	1 11	1 12	1 13			36
37	1 9	1 7	1 5	1 4	1 4	1 5	1 6	1 6	1 7	1 7	1 8	1 8	1 9	1 9	1 10	1 11			37
38	1 9	1 7	1 5	1 3	1 3	1 4	1 5	1 5	1 6	1 6	1 7	1 7	1 8	1 8	1 8	1 9			38
39	1 9	1 7	1 5	1 3	1 3	1 3	1 4	1 4	1 5	1 5	1 6	1 6	1 6	1 7	1 7	1 7			39
40	1 9	1 7	1 5	1 3	1 2	1 2	1 3	1 3	1 4	1 4	1 5	1 5	1 5	1 6	1 6	1 6			40
41	1 10	1 8	1 5	1 3	1 1	1 1	1 2	1 2	1 3	1 3	1 4	1 4	1 4	1 5	1 5	1 5			41
42	1 10	1 8	1 5	1 3	1 1	1 1	1 1	1 2	1 2	1 3	1 3	1 3	1 3	1 4	1 4	1 4			42
43	1 11	1 8	1 6	1 4	1 1	1 0	1 0	1 1	1 1	1 1	1 2	1 2	1 2	1 3	1 3	1 3			43
44	1 12	1 9	1 6	1 4	1 1	1 0	1 0	1 0	1 0	1 0	1 1	1 1	1 1	1 1	1 1	1 1			44
46	1 12	1 9	1 6	1 4	1 1	59	59	59	59	59	59	59	59	59	59	59			46
48	1 13	1 10	1 7	1 4	1 1	59	58	58	58	58	57	57	57	57	57	57			48
50	1 13	1 10	1 7	1 5	1 1	59	57	57	57	57	56	56	56	56	56				50
52	1 14	1 11	1 8	1 5	1 1	59	57	56	56	56	55	55	54	54	54				52
54	1 15	1 11	1 8	1 6	1 2	59	57	56	55	55	54	54	53	53					54
56	1 15	1 11	1 8	1 6	1 2	59	57	55	54	54	53	53	52	52					56
58	1 16	1 12	1 9	1 6	1 2	59	57	55	54	53	52	52	51						58
60	1 16	1 12	1 9	1 6	1 2	59	57	55	53	52	52	51	50						60
62	1 17	1 13	1 10	1 7	1 2	59	57	55	53	52	51	51							62
64	1 17	1 13	1 10	1 7	1 2	59	57	55	53	52	51	50							64
66	1 18	1 14	1 10	1 7	1 3	59	57	54	52	51	50								66
68	1 18	1 14	1 10	1 7	1 3	59	56	54	52	51	50								68
70	1 19	1 15	1 11	1 8	1 3	59	56	54	52	51									70
72	1 19	1 15	1 11	1 8	1 3	59	56	54	52	50									72
74	1 20	1 15	1 11	1 8	1 3	59	56	53	51										74
76	1 20	1 16	1 12	1 8	1 3	59	56	53	51										76
78	1 21	1 16	1 12	1 9	1 4	59	56	53											78
80	1 21	1 16	1 12	1 9	1 4	59	56	53											80
82	1 21	1 16	1 12	1 9	1 4	59	56												82
84		1 16	1 12	1 9	1 4	59	56												84
86			1 12	1 9	1 4	59													86
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°			

TABLE XVIII.

THIRD CORRECTION to APPARENT DISTANCE 52°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.															☽'s App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	1 18	1 19	1 21	1 24	1 30	1 37	1 44	2 0	2 17	2 34	2 51	3 10	3 28	3 47	4 6	4 24	6
7	1 21	1 18	1 19	1 21	1 24	1 29	1 34	1 46	2 0	2 14	2 28	2 42	2 57	3 12	3 27	3 43	7
8	1 25	1 21	1 18	1 19	1 21	1 24	1 27	1 36	1 47	1 58	2 11	2 23	2 36	2 50	3 3	3 16	8
9	1 30	1 24	1 20	1 18	1 19	1 21	1 23	1 29	1 37	1 47	1 57	2 8	2 19	2 31	2 42	2 53	9
10	1 37	1 28	1 23	1 20	1 18	1 19	1 21	1 25	1 30	1 38	1 46	1 56	2 6	2 16	2 26	2 36	10
11	1 45	1 34	1 28	1 23	1 20	1 18	1 19	1 22	1 26	1 32	1 39	1 47	1 56	2 4	2 13	2 22	11
12	1 54	1 41	1 33	1 27	1 22	1 20	1 18	1 20	1 23	1 27	1 33	1 40	1 47	1 54	2 2	2 10	12
13	2 2	1 48	1 38	1 31	1 25	1 22	1 19	1 19	1 21	1 24	1 29	1 35	1 41	1 47	1 54	2 1	13
14	2 11	1 55	1 44	1 35	1 28	1 24	1 21	1 18	1 19	1 22	1 26	1 30	1 35	1 41	1 47	1 52	14
15	2 19	2 2	1 50	1 39	1 32	1 27	1 23	1 19	1 18	1 20	1 23	1 26	1 30	1 35	1 40	1 44	15
16	2 28	2 9	1 55	1 44	1 35	1 30	1 25	1 20	1 17	1 18	1 20	1 23	1 26	1 30	1 34	1 38	16
17	2 37	2 16	2 0	1 48	1 39	1 33	1 27	1 21	1 18	1 17	1 18	1 20	1 23	1 26	1 30	1 33	17
18	2 46	2 23	2 6	1 53	1 43	1 36	1 30	1 23	1 19	1 16	1 17	1 18	1 20	1 23	1 26	1 29	18
19	2 56	2 30	2 12	1 59	1 48	1 40	1 33	1 25	1 20	1 17	1 16	1 17	1 18	1 20	1 23	1 26	19
20	3 5	2 37	2 18	2 4	1 52	1 44	1 37	1 27	1 22	1 18	1 15	1 16	1 17	1 18	1 20	1 23	20
21	3 14	2 44	2 24	2 9	1 57	1 48	1 40	1 29	1 23	1 19	1 16	1 16	1 16	1 17	1 18	1 20	21
22	3 23	2 52	2 31	2 15	2 1	1 52	1 44	1 32	1 25	1 20	1 16	1 15	1 15	1 16	1 17	1 18	22
23	3 32	2 59	2 38	2 20	2 6	1 56	1 47	1 34	1 26	1 21	1 17	1 15	1 14	1 15	1 16	1 17	23
24	3 41	3 7	2 44	2 26	2 11	2 0	1 51	1 37	1 28	1 22	1 18	1 15	1 14	1 14	1 15	1 16	24
25	3 50	3 14	2 51	2 31	2 16	2 4	1 54	1 40	1 30	1 23	1 19	1 16	1 14	1 13	1 14	1 15	25
26	3 59	3 22	2 58	2 37	2 21	2 8	1 58	1 42	1 32	1 25	1 20	1 16	1 14	1 13	1 13	1 14	26
27	4 8	3 30	3 5	2 42	2 26	2 12	2 2	1 45	1 33	1 26	1 21	1 17	1 15	1 14	1 13	1 13	27
28	4 17	3 38	3 12	2 48	2 31	2 16	2 6	1 48	1 35	1 28	1 22	1 18	1 15	1 14	1 13	1 13	28
29	4 26	3 45	3 19	2 53	2 36	2 21	2 10	1 51	1 37	1 29	1 23	1 19	1 16	1 14	1 13	1 12	29
30	4 34	3 53	3 25	2 59	2 41	2 25	2 13	1 54	1 39	1 31	1 24	1 19	1 16	1 14	1 13	1 12	30
31	4 43	4 0	3 32	3 5	2 45	2 29	2 17	1 57	1 41	1 32	1 25	1 20	1 17	1 15	1 13	1 12	31
32	4 52	4 8	3 38	3 10	2 50	2 34	2 20	1 59	1 43	1 34	1 27	1 21	1 17	1 15	1 13	1 12	32
33	5 0	4 15	3 44	3 16	2 55	2 38	2 24	2 2	1 45	1 36	1 29	1 23	1 18	1 15	1 13	1 12	33
34	5 9	4 22	3 50	3 21	2 59	2 42	2 27	2 5	1 48	1 38	1 30	1 24	1 19	1 16	1 14	1 12	34
35	5 17	4 29	3 56	3 27	3 4	2 46	2 31	2 7	1 51	1 40	1 32	1 25	1 20	1 17	1 14	1 12	35
36	5 26	4 36	4 2	3 32	3 9	2 50	2 34	2 10	1 53	1 42	1 33	1 26	1 21	1 17	1 14	1 12	36
37	5 34	4 42	4 8	3 37	3 14	2 54	2 38	2 13	1 56	1 44	1 34	1 27	1 22	1 18	1 15	1 13	37
38	5 42	4 49	4 13	3 42	3 18	2 58	2 42	2 16	1 58	1 46	1 36	1 28	1 22	1 18	1 15	1 13	38
39	5 50	4 56	4 19	3 47	3 23	3 2	2 46	2 19	2 1	1 48	1 38	1 30	1 23	1 18	1 15	1 13	39
40	5 58	5 3	4 24	3 52	3 27	3 6	2 49	2 22	2 3	1 50	1 39	1 31	1 25	1 19	1 16	1 14	40
41	6 6	5 9	4 30	3 57	3 32	3 10	2 53	2 25	2 6	1 52	1 41	1 32	1 26	1 20	1 16	1 14	41
42	6 14	5 15	4 35	4 2	3 36	3 14	2 56	2 28	2 8	1 54	1 42	1 34	1 27	1 21	1 17	1 15	42
43	6 21	5 21	4 41	4 7	3 40	3 18	3 0	2 31	2 11	1 56	1 44	1 35	1 28	1 22	1 18	1 15	43
44	6 28	5 27	4 46	4 12	3 44	3 22	3 3	2 34	2 13	1 58	1 45	1 37	1 29	1 23	1 19	1 16	44
46	6 42	5 39	4 56	4 21	3 52	3 29	3 10	2 39	2 18	2 1	1 48	1 39	1 31	1 24	1 20	1 17	46
48	6 55	5 51	5 6	4 30	3 59	3 36	3 16	2 44	2 22	2 5	1 51	1 41	1 33	1 26	1 21	1 18	48
50	7 8	6 2	5 16	4 38	4 7	3 43	3 23	2 49	2 26	2 8	1 54	1 43	1 35	1 27	1 22	1 19	50
52	7 21	6 13	5 25	4 46	4 15	3 50	3 29	2 54	2 30	2 11	1 57	1 45	1 36	1 29	1 24	1 20	52
54	7 33	6 23	5 34	4 53	4 22	3 56	3 35	2 59	2 34	2 14	2 0	1 48	1 38	1 31	1 25	1 21	54
56	7 44	6 33	5 43	4 59	4 29	4 2	3 40	3 4	2 38	2 17	2 2	1 50	1 40	1 32	1 26	1 22	56
58	7 53	6 42	5 50	5 6	4 35	4 7	3 45	3 8	2 42	2 20	2 5	1 53	1 42	1 33	1 27	1 23	58
60	8 2	6 49	5 56	5 12	4 40	4 12	3 50	3 12	2 46	2 23	2 7	1 55	1 44	1 35	1 29	1 24	60
62			6 2	5 17	4 45	4 16	3 54	3 15	2 49	2 26	2 9	1 57	1 46	1 36	1 30	1 25	62
64					4 50	4 20	3 58	3 18	2 51	2 28	2 11	1 59	1 48	1 37	1 31	1 26	64
66						4	1 3	3 20	2 53	2 30	2 13	2 0	1 49	1 39	1 32	1 26	66
68								3 22	2 54	2 32	2 15	2 1	1 50	1 40	1 33	1 27	68
70									2 55	2 33	2 16	2 1	1 51	1 41	1 34	1 28	70
72										2 34	2 17	2 2	1 52	1 42	1 34	1 28	72
74											2 18	2 4	1 53	1 43	1 35	1 29	74
76												2 5	1 54	1 44	1 36	1 29	76
78													1 55	1 44	1 36	1 30	78
80														1 45	1 37	1 30	80
82															1 38	1 30	82
84																1 31	84
86																	86
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28	30°	

TABLE XVIII.

Third Correction, to Apparent Distance 52°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.															☽'s App Alt.
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	4 43	5 1	5 18	5 34	6 6	6 36	7 4	7 29	7 53								6
7	3 59	4 14	4 29	4 43	5 9	5 34	5 58	6 20	6 42								7
8	3 38	3 43	3 55	4 8	4 30	4 52	5 13	5 32	5 50	6 6							8
9	3 4	3 15	3 26	3 37	3 58	4 17	4 36	4 51	5 5	5 18							9
10	2 45	2 54	3 4	3 14	3 32	3 48	4 4	4 20	4 33	4 45							10
11	2 30	2 38	2 47	2 55	3 11	3 26	3 40	3 54	4 6	4 16							11
12	2 17	2 25	2 32	2 40	2 54	3 7	3 20	3 32	3 43	3 52	4 1						12
13	2 7	2 13	2 20	2 26	2 39	2 51	3 3	3 14	3 24	3 32	3 38						13
14	1 58	2 3	2 9	2 14	2 26	2 37	2 48	2 58	3 7	3 14	3 20						14
15	1 49	1 54	1 59	2 4	2 15	2 26	2 35	2 44	2 52	2 59	3 5						15
16	1 42	1 47	1 51	1 56	2 7	2 16	2 24	2 32	2 40	2 46	2 52	2 57					16
17	1 37	1 41	1 45	1 50	2 0	2 8	2 15	2 22	2 29	2 35	2 40	2 44					17
18	1 32	1 36	1 40	1 45	1 53	2 0	2 7	2 13	2 19	2 25	2 30	2 33					18
19	1 29	1 32	1 36	1 40	1 47	1 53	2 0	2 6	2 11	2 16	2 21	2 24					19
20	1 26	1 29	1 32	1 35	1 41	1 47	1 53	1 59	2 4	2 9	2 13	2 16	2 19				20
21	1 23	1 26	1 28	1 31	1 37	1 42	1 47	1 53	1 58	2 2	2 6	2 9	2 11				21
22	1 21	1 23	1 25	1 28	1 33	1 37	1 42	1 47	1 52	1 56	1 59	2 2	2 4				22
23	1 19	1 21	1 23	1 25	1 29	1 33	1 38	1 42	1 47	1 51	1 54	1 56	1 58				23
24	1 17	1 19	1 21	1 23	1 26	1 30	1 34	1 38	1 42	1 46	1 49	1 51	1 53	1 55			24
25	1 16	1 17	1 19	1 20	1 23	1 27	1 30	1 34	1 37	1 41	1 44	1 46	1 48	1 49			25
26	1 15	1 16	1 17	1 18	1 21	1 24	1 27	1 30	1 33	1 36	1 39	1 41	1 43	1 44			26
27	1 14	1 15	1 16	1 17	1 19	1 22	1 24	1 27	1 30	1 32	1 35	1 37	1 39	1 40			27
28	1 13	1 14	1 15	1 16	1 17	1 20	1 22	1 24	1 27	1 29	1 31	1 33	1 35	1 36	1 37		28
29	1 12	1 13	1 14	1 15	1 16	1 18	1 20	1 22	1 24	1 26	1 28	1 30	1 31	1 32	1 33		29
30	1 12	1 12	1 13	1 13	1 14	1 16	1 18	1 20	1 22	1 24	1 25	1 27	1 28	1 29	1 30		30
31	1 11	1 11	1 12	1 12	1 13	1 15	1 16	1 18	1 20	1 22	1 23	1 24	1 25	1 26	1 27		31
32	1 11	1 11	1 11	1 11	1 12	1 14	1 15	1 16	1 18	1 20	1 21	1 22	1 23	1 23	1 24	1 25	32
33	1 11	1 10	1 10	1 10	1 11	1 13	1 14	1 15	1 17	1 18	1 19	1 20	1 21	1 21	1 22	1 22	33
34	1 11	1 10	1 10	1 10	1 11	1 12	1 13	1 14	1 16	1 17	1 17	1 18	1 19	1 19	1 20	1 20	34
35	1 11	1 10	1 10	1 10	1 10	1 11	1 12	1 13	1 14	1 15	1 15	1 16	1 17	1 17	1 18	1 18	35
36	1 11	1 10	1 9	1 9	1 9	1 10	1 11	1 11	1 12	1 13	1 13	1 14	1 15	1 15	1 16	1 16	36
37	1 11	1 10	1 9	1 9	1 9	1 9	1 10	1 10	1 11	1 11	1 12	1 12	1 13	1 13	1 14	1 14	37
38	1 11	1 10	1 9	1 8	1 8	1 9	1 9	1 9	1 10	1 10	1 11	1 11	1 11	1 11	1 12	1 12	38
39	1 11	1 10	1 9	1 8	1 8	1 8	1 8	1 9	1 9	1 10	1 10	1 10	1 10	1 10	1 10	1 10	39
40	1 12	1 10	1 9	1 8	1 7	1 7	1 7	1 8	1 8	1 9	1 9	1 9	1 9	1 9	1 9	1 9	40
41	1 12	1 11	1 9	1 8	1 7	1 7	1 7	1 7	1 7	1 8	1 8	1 8	1 8	1 8	1 8	1 8	41
42	1 13	1 11	1 9	1 8	1 6	1 6	1 6	1 6	1 6	1 7	1 7	1 7	1 7	1 7	1 7	1 7	42
43	1 13	1 11	1 9	1 8	1 6	1 6	1 6	1 6	1 6	1 6	1 6	1 6	1 6	1 6	1 6	1 6	43
44	1 14	1 11	1 9	1 8	1 6	1 5	1 5	1 5	1 5	1 5	1 5	1 5	1 5	1 5	1 5	1 5	44
46	1 14	1 12	1 10	1 9	1 6	1 4	1 4	1 4	1 4	1 4	1 4	1 3	1 3	1 3	1 3		46
48	1 15	1 13	1 11	1 9	1 6	1 4	1 3	1 3	1 3	1 2	1 2	1 1	1 1	1 1	1 1		48
50	1 16	1 14	1 11	1 9	1 6	1 4	1 2	1 2	1 2	1 1	1 1	1 0	1 0	1 0			50
52	1 17	1 15	1 12	1 9	1 6	1 4	1 2	1 1	1 1	1 0	1 0	59	58	58			52
54	1 18	1 15	1 12	1 9	1 6	1 4	1 2	1 1	1 0	59	59	58	57				54
56	1 18	1 15	1 12	1 10	1 6	1 4	1 2	1 0	59	58	58	57	56				56
58	1 19	1 16	1 13	1 10	1 6	1 4	1 2	1 0	59	58	57	56					58
60	1 20	1 16	1 13	1 10	1 7	1 4	1 2	1 0	58	57	56	55					60
62	1 21	1 17	1 13	1 10	1 7	1 4	1 1	59	58	56	55						62
64	1 22	1 18	1 14	1 11	1 7	1 4	1 1	59	57	56	54						64
66	1 22	1 18	1 14	1 11	1 7	1 4	1 1	59	57	55							66
68	1 22	1 18	1 14	1 11	1 7	1 3	1 0	58	56	54							68
70	1 23	1 18	1 14	1 11	1 7	1 3	1 0	58	56								70
72	1 23	1 19	1 15	1 11	1 7	1 3	1 0	57	55								72
74	1 24	1 19	1 15	1 11	1 7	1 3	1 0	57									74
76	1 24	1 19	1 15	1 12	1 7	1 3	1 0	56									76
78	1 24	1 19	1 15	1 12	1 7	1 3	1 0										78
80	1 24	1 19	1 15	1 12	1 7	1 3	1 0										80
82	1 25	1 20	1 16	1 12	1 7	1 3											82
84	1 25	1 20	1 16	1 12	1 7	1 3											84
86	1 25	1 21	1 16	1 12	1 7												86
°	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°						°

TABLE P. EFFECT OF SUN'S PAR.

Add the Numbers above the lines to 3rd Correction, subtract the others.

☽'s App Alt.	Sun's Apparent Altitude.									
	5	10	20	30	40	50	60	70	80	90
	″	″	″	″	″	″	″	″	″	″
5	0	1	2	3	4	4				
10	1	1	1	2	3	3	4			
20	2	3	1	0	1	2	2	3		
30	3	4	3	2	1	0	0	1		
40	7	6	5	4	3	2	1	1	0	0
50	8	8	6	5	4	3	3	2	2	
60		9	7	6	5	4	4	2		
70			6	7	6	5	5			
80				8	7	6				
90					7					

TABLE XVIII.

Third Correction to Apparent Distance 56°.

☽'s App Alt.	Apparent Altitude of the Sun, or Star.															☽'s App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	1 20	1 22	1 25	1 29	1 35	1 41	1 48	2 2	2 18	2 35	2 52	3 10	3 27	3 45	4 3	4 20	6
7	1 23	1 20	1 22	1 24	1 27	1 32	1 37	1 48	2 1	2 15	2 29	2 43	2 58	3 12	3 27	3 42	7
8	1 28	1 23	1 20	1 21	1 23	1 26	1 29	1 38	1 48	2 0	2 12	2 23	2 35	2 48	3 1	3 14	8
9	1 34	1 27	1 22	1 20	1 21	1 23	1 25	1 31	1 39	1 48	1 58	2 8	2 18	2 29	2 40	2 50	9
10	1 40	1 31	1 25	1 22	1 20	1 21	1 22	1 26	1 32	1 39	1 48	1 56	2 5	2 15	2 24	2 33	10
11	1 47	1 36	1 29	1 25	1 22	1 20	1 21	1 23	1 27	1 33	1 40	1 47	1 55	2 4	2 12	2 20	11
12	1 54	1 42	1 33	1 28	1 24	1 21	1 20	1 21	1 24	1 28	1 34	1 40	1 47	1 55	2 2	2 9	12
13	2 2	1 48	1 38	1 31	1 26	1 23	1 21	1 20	1 22	1 25	1 30	1 35	1 41	1 47	1 54	2 0	13
14	2 10	1 54	1 43	1 35	1 29	1 25	1 22	1 19	1 20	1 23	1 27	1 31	1 36	1 41	1 47	1 52	14
15	2 18	2 1	1 48	1 39	1 33	1 28	1 24	1 21	1 19	1 21	1 24	1 27	1 32	1 36	1 41	1 46	15
16	2 27	2 8	1 53	1 43	1 36	1 31	1 26	1 22	1 19	1 19	1 21	1 24	1 28	1 32	1 36	1 40	16
17	2 35	2 15	1 59	1 47	1 40	1 34	1 29	1 23	1 20	1 18	1 19	1 22	1 25	1 28	1 32	1 35	17
18	2 44	2 22	2 4	1 52	1 43	1 37	1 31	1 25	1 20	1 17	1 18	1 20	1 22	1 25	1 28	1 31	18
19	2 53	2 29	2 10	1 57	1 47	1 40	1 34	1 26	1 21	1 18	1 17	1 19	1 20	1 23	1 25	1 28	19
20	3 2	2 36	2 16	2 2	1 51	1 44	1 37	1 28	1 22	1 19	1 17	1 18	1 19	1 21	1 23	1 25	20
21	3 11	2 44	2 22	2 8	1 55	1 47	1 40	1 30	1 24	1 20	1 18	1 17	1 18	1 19	1 21	1 23	21
22	3 20	2 51	2 29	2 13	2 0	1 51	1 43	1 32	1 25	1 21	1 18	1 16	1 17	1 18	1 19	1 21	22
23	3 29	2 58	2 35	2 18	2 5	1 55	1 46	1 35	1 27	1 22	1 19	1 17	1 16	1 17	1 18	1 19	23
24	3 38	3 5	2 42	2 23	2 9	1 59	1 50	1 37	1 29	1 24	1 20	1 17	1 16	1 16	1 17	1 18	24
25	3 47	3 13	2 49	2 29	2 14	2 3	1 53	1 39	1 31	1 25	1 21	1 18	1 16	1 16	1 16	1 17	25
26	3 55	3 20	2 55	2 34	2 19	2 7	1 57	1 42	1 33	1 27	1 22	1 19	1 17	1 16	1 16	1 16	26
27	4 4	3 27	3 1	2 39	2 24	2 12	2 1	1 45	1 35	1 28	1 23	1 19	1 17	1 16	1 16	1 16	27
28	4 12	3 34	3 8	2 45	2 29	2 16	2 5	1 48	1 37	1 30	1 24	1 20	1 18	1 16	1 15	1 16	28
29	4 21	3 41	3 14	2 50	2 33	2 20	2 8	1 51	1 39	1 31	1 25	1 21	1 18	1 16	1 15	1 15	29
30	4 29	3 48	3 20	2 55	2 38	2 24	2 12	1 54	1 41	1 33	1 26	1 21	1 18	1 16	1 15	1 15	30
31	4 38	3 55	3 26	3 0	2 43	2 28	2 16	1 57	1 44	1 34	1 28	1 22	1 18	1 16	1 16	1 15	31
32	4 46	4 2	3 32	3 6	2 48	2 32	2 19	2 0	1 46	1 36	1 29	1 23	1 19	1 17	1 16	1 15	32
33	4 54	4 9	3 39	3 11	2 53	2 36	2 23	2 3	1 49	1 38	1 31	1 25	1 20	1 17	1 16	1 15	33
34	5 2	4 16	3 45	3 16	2 57	2 40	2 26	2 6	1 51	1 40	1 32	1 26	1 21	1 18	1 16	1 15	34
35	5 10	4 23	3 51	3 22	3 2	2 44	2 30	2 9	1 53	1 42	1 34	1 27	1 22	1 18	1 16	1 15	35
36	5 18	4 30	3 57	3 27	3 6	2 48	2 33	2 12	1 55	1 44	1 35	1 28	1 23	1 19	1 17	1 16	36
37	5 26	4 37	4 3	3 32	3 10	2 52	2 37	2 15	1 58	1 46	1 37	1 29	1 24	1 20	1 18	1 16	37
38	5 33	4 43	4 8	3 37	3 14	2 56	2 41	2 17	2 0	1 48	1 38	1 30	1 25	1 21	1 18	1 16	38
39	5 41	4 50	4 14	3 42	3 19	3 0	2 45	2 20	2 2	1 50	1 39	1 31	1 25	1 21	1 18	1 16	39
40	5 48	4 56	4 19	3 47	3 23	3 4	2 48	2 23	2 4	1 51	1 40	1 32	1 26	1 22	1 19	1 16	40
41	5 55	5 2	4 25	3 52	3 28	3 8	2 51	2 25	2 6	1 53	1 42	1 33	1 27	1 23	1 20	1 17	41
42	6 2	5 8	4 30	3 57	3 32	3 11	2 54	2 28	2 9	1 55	1 43	1 34	1 28	1 24	1 20	1 17	42
43	6 9	5 14	4 35	4 2	3 36	3 15	2 58	2 31	2 12	1 57	1 44	1 35	1 29	1 25	1 21	1 17	43
44	6 16	5 20	4 40	4 7	3 40	3 19	3 1	2 34	2 14	1 59	1 46	1 37	1 31	1 26	1 22	1 18	44
46	6 29	5 32	4 50	4 16	3 48	3 26	3 8	2 40	2 18	2 2	1 49	1 40	1 33	1 28	1 23	1 19	46
48	6 42	5 43	4 59	4 24	3 56	3 33	3 14	2 45	2 22	2 6	1 52	1 43	1 36	1 30	1 25	1 20	48
50	6 54	5 54	5 8	4 32	4 3	3 40	3 19	2 50	2 26	2 9	1 55	1 45	1 38	1 32	1 26	1 21	50
52	7 6	6 4	5 17	4 39	4 10	3 46	3 24	2 55	2 30	2 12	1 58	1 48	1 40	1 33	1 27	1 22	52
54	7 18	6 14	5 25	4 46	4 16	3 52	3 29	2 59	2 34	2 15	2 0	1 50	1 42	1 35	1 29	1 24	54
56	7 29	6 24	5 33	4 53	4 22	3 57	3 34	3 3	2 37	2 19	2 3	1 52	1 43	1 36	1 30	1 25	56
58	7 40	6 33	5 41	5 0	4 28	4 2	3 39	3 7	2 41	2 22	2 6	1 54	1 45	1 37	1 31	1 26	58
60	7 50	6 41	5 48	5 7	4 34	4 7	3 43	3 11	2 44	2 25	2 8	1 56	1 47	1 39	1 32	1 27	60
62	7 58	6 48	5 55	5 13	4 40	4 12	3 48	3 15	2 47	2 28	2 11	1 58	1 48	1 40	1 33	1 28	62
64	8 6	6 55	6 1	5 19	4 45	4 17	3 52	3 18	2 50	2 30	2 13	2 0	1 50	1 41	1 34	1 29	64
66			6 7	5 24	4 50	4 21	3 56	3 20	2 53	2 32	2 15	2 2	1 51	1 42	1 35	1 29	66
68					4 55	4 25	4 0	3 22	2 55	2 34	2 17	2 4	1 52	1 43	1 36	1 30	68
70							4 4	3 24	2 57	2 36	2 18	2 5	1 53	1 44	1 37	1 31	70
72								3 26	2 59	2 37	2 19	2 6	1 54	1 45	1 38	1 32	72
74									3 1	2 38	2 20	2 7	1 55	1 46	1 39	1 32	74
76										2 39	2 21	2 8	1 56	1 47	1 39	1 33	76
78											2 22	2 8	1 57	1 48	1 40	1 33	78
80												2 9	1 58	1 48	1 40	1 34	80
82													1 58	1 48	1 40	1 34	82
84														1 49	1 41	1 34	84
86															1 41	1 34	86
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	

TABLE XVIII.

THIRD CORRECTION, to APPARENT DISTANCE 56°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																								☽'s App Alt.
	32°		34°		36°		38°		42°		46°		50°		54°		58°		62°		66°		70°		74°		78°		82°		86°	
°	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	°
6	4	37	4	54	5	10	5	26	5	56	6	25	6	52	7	15	7	37	7	58													6
7	3	57	4	11	4	25	4	38	5	3	5	29	5	52	6	12	6	31	6	48													7
8	3	26	3	38	3	51	4	3	4	26	4	47	5	5	5	23	5	40	5	55	6	8											8
9	3	1	3	12	3	23	3	33	3	53	4	12	4	30	4	46	5	0	5	13	5	25											9
10	2	43	2	53	3	2	3	11	3	28	3	45	4	1	4	15	4	27	4	39	4	50											10
11	2	29	2	37	2	45	2	53	3	9	3	24	3	38	3	50	4	1	4	12	4	21											11
12	2	16	2	23	2	30	2	38	2	52	3	6	3	18	3	28	3	38	3	47	3	56	4	4									12
13	2	6	2	12	2	18	2	25	2	37	2	50	3	1	3	10	3	19	3	28	3	36	3	42									13
14	1	57	2	3	2	8	2	14	2	25	2	36	2	47	2	56	3	4	3	12	3	19	3	24									14
15	1	50	1	55	1	59	2	5	2	15	2	25	2	35	2	44	2	51	2	58	3	4	3	10									15
16	1	44	1	48	1	53	1	58	2	7	2	16	2	25	2	33	2	39	2	45	2	51	2	57	3	2							16
17	1	39	1	43	1	48	1	52	2	0	2	8	2	16	2	24	2	30	2	35	2	40	2	45	2	49							17
18	1	35	1	39	1	43	1	47	1	54	2	1	2	8	2	15	2	21	2	26	2	31	2	35	2	38							18
19	1	31	1	35	1	38	1	42	1	48	1	55	2	1	2	7	2	13	2	18	2	23	2	27	2	30							19
20	1	28	1	31	1	34	1	37	1	43	1	49	1	55	2	0	2	6	2	10	2	15	2	19	2	22	2	24					20
21	1	25	1	27	1	30	1	33	1	38	1	44	1	49	1	54	1	59	2	3	2	7	2	11	2	14	2	16					21
22	1	22	1	24	1	27	1	30	1	34	1	39	1	44	1	48	1	52	1	56	2	0	2	4	2	6	2	8					22
23	1	20	1	22	1	24	1	27	1	31	1	35	1	40	1	44	1	47	1	51	1	54	1	57	2	0	2	2					23
24	1	19	1	20	1	22	1	25	1	28	1	32	1	36	1	40	1	43	1	46	1	49	1	52	1	54	1	56	1	58			24
25	1	18	1	19	1	21	1	23	1	26	1	29	1	33	1	36	1	39	1	42	1	44	1	47	1	49	1	51	1	53			25
26	1	17	1	18	1	19	1	21	1	24	1	27	1	30	1	33	1	35	1	38	1	40	1	42	1	44	1	46	1	48			26
27	1	16	1	17	1	18	1	19	1	22	1	25	1	27	1	30	1	32	1	35	1	37	1	39	1	40	1	42	1	44			27
28	1	16	1	16	1	17	1	18	1	20	1	23	1	25	1	27	1	29	1	32	1	34	1	36	1	37	1	39	1	40	1	41	28
29	1	15	1	15	1	16	1	17	1	19	1	21	1	23	1	25	1	27	1	29	1	31	1	33	1	34	1	35	1	36	1	37	29
30	1	15	1	15	1	16	1	16	1	17	1	19	1	21	1	23	1	25	1	27	1	29	1	30	1	31	1	32	1	33	1	34	30
31	1	14	1	14	1	15	1	15	1	16	1	18	1	19	1	21	1	23	1	25	1	27	1	28	1	29	1	29	1	30	1	31	31
32	1	14	1	14	1	14	1	14	1	15	1	17	1	18	1	19	1	21	1	23	1	25	1	26	1	27	1	27	1	27	1	28	32
33	1	14	1	13	1	13	1	13	1	14	1	16	1	17	1	18	1	20	1	21	1	23	1	24	1	25	1	25	1	25	1	26	33
34	1	14	1	13	1	13	1	13	1	14	1	15	1	16	1	17	1	19	1	20	1	21	1	22	1	23	1	23	1	23	1	24	34
35	1	14	1	13	1	13	1	13	1	13	1	14	1	15	1	16	1	17	1	18	1	19	1	20	1	21	1	21	1	21	1	22	35
36	1	14	1	13	1	12	1	12	1	12	1	13	1	14	1	15	1	16	1	16	1	17	1	18	1	19	1	19	1	19	1	20	36
37	1	14	1	13	1	12	1	12	1	12	1	12	1	13	1	14	1	15	1	15	1	16	1	16	1	17	1	17	1	17	1	18	37
38	1	14	1	13	1	12	1	11	1	11	1	12	1	13	1	13	1	14	1	14	1	15	1	15	1	16	1	16	1	16	1	17	38
39	1	14	1	13	1	12	1	11	1	11	1	11	1	12	1	12	1	13	1	13	1	13	1	13	1	14	1	14	1	15	1	15	39
40	1	14	1	13	1	12	1	11	1	10	1	10	1	11	1	11	1	12	1	12	1	12	1	12	1	12	1	13	1	13	1	13	40
41	1	15	1	14	1	12	1	11	1	10	1	10	1	10	1	10	1	11	1	11	1	11	1	11	1	11	1	12	1	12			41
42	1	15	1	14	1	12	1	11	1	9	1	9	1	9	1	9	1	10	1	10	1	10	1	10	1	10	1	11	1	11			42
43	1	15	1	14	1	12	1	11	1	9	1	9	1	9	1	9	1	9	1	9	1	9	1	9	1	9	1	10	1	10			43
44	1	16	1	14	1	12	1	11	1	9	1	8	1	8	1	8	1	8	1	8	1	8	1	8	1	8	1	9	1	9			44
46	1	17	1	15	1	13	1	12	1	9	1	7	1	7	1	7	1	6	1	6	1	6	1	6	1	7	1	7	1	7			46
48	1	17	1	15	1	13	1	12	1	9	1	7	1	6	1	6	1	5	1	5	1	5	1	5	1	5	1	6					48
50	1	18	1	16	1	14	1	12	1	9	1	6	1	5	1	5	1	4	1	4	1	4	1	4	1	4							50
52	1	19	1	17	1	15	1	13	1	9	1	6	1	4	1	4	1	3	1	3	1	3	1	3	1	3							52
54	1	20	1	17	1	15	1	13	1	9	1	6	1	4	1	3	1	3	1	2	1	2	1	2									54
56	1	21	1	18	1	16	1	14	1	10	1	6	1	4	1	2	1	2	1	1	1	1	1	1									56
58	1	22	1	19	1	16	1	14	1	10	1	6	1	4	1	2	1	1	1	0	1	0											58
60	1	23	1	19	1	16	1	14	1	10	1	6	1	4	1	2	1	1	1	0	1	0											60
62	1	24	1	20	1	17	1	14	1	10	1	6	1	4	1	2	1	1	1	0													62
64	1	24	1	20	1	17	1	14	1	11	1	7	1	4	1	2	1	0	1	0													64
66	1	25	1	21	1	18	1	15	1	11	1	7	1	4	1	2	1	0															66
68	1	25	1	21	1	18	1	15	1	11	1	7	1	4	1	2	1	0															68
70	1	26	1	22	1	19	1	16	1	11	1	7	1	4	1	2																	70
72	1	27	1	23	1	19	1	16	1	11	1	7	1	4	1	2																	72
74	1	27	1	23	1	19	1	16	1	11	1	7	1	4																			74
76	1	28	1	23	1	19	1	16	1	11	1	7	1	4																			76
78	1	28	1	23	1	20	1	17	1	11	1	7																					78
80	1	29	1	24	1	20	1	17	1	11	1	7																					80
82	1	29	1	24	1	20	1	17	1	11																							82
84	1	29	1	24	1	20	1	17	1	11																							84
86	1	29	1	24	1	20	1	17																									86
	32°		34°		36°		38°		42°		46°		50°		54°		58°		62°		66°											

TABLE P. EFFECT OF SUN'S PAR

Add the Numbers above the lines to 3rd Correction, subtract the others.

☽'s App Alt.	Sun's Apparent Altitude.								
	5	10	20	30	40	50	60	70	80	90
	″	″	″	″	″	″	″	″	″	″
5	0	0	1	2	3	4	4			
10	1	1	0	1	2	3	3			
20	3	3	2	1	0	1	2	2		
30	5	4	3	2	1	1	0	0	1	
40	6	6	5	4	3	2	2	1	1	0
50	8	7	6	5	4	4	3	3		
60	9	8	7	6	5	5	4			
70		9	8	7	6	6				
80			8	8	7					
90				8						

M

TABLE XVIII.

Third Correction, to Apparent Distance 60°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																☽'s App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	1 22	1 23	1 25	1 28	1 33	1 40	1 47	2 1	2 16	2 33	2 50	3 8	3 25	3 41	3 58	4 15	6
7	1 24	1 22	1 23	1 25	1 28	1 33	1 37	1 47	1 59	2 13	2 27	2 41	2 55	3 9	3 23	3 37	7
8	1 28	1 24	1 22	1 23	1 25	1 28	1 31	1 39	1 48	1 59	2 11	2 23	2 35	2 48	3 0	3 12	8
9	1 33	1 28	1 24	1 22	1 24	1 25	1 27	1 33	1 40	1 49	1 58	2 8	2 18	2 29	2 39	2 50	9
10	1 40	1 33	1 27	1 24	1 23	1 24	1 25	1 29	1 34	1 41	1 49	1 57	2 6	2 15	2 25	2 34	10
11	1 47	1 38	1 31	1 27	1 24	1 23	1 24	1 26	1 30	1 36	1 42	1 49	1 57	2 5	2 13	2 21	11
12	1 55	1 43	1 36	1 30	1 26	1 24	1 23	1 25	1 28	1 32	1 37	1 43	1 49	1 56	2 3	2 11	12
13	2 3	1 49	1 40	1 34	1 29	1 26	1 24	1 24	1 26	1 29	1 33	1 38	1 43	1 49	1 55	2 2	13
14	2 10	1 55	1 45	1 38	1 32	1 28	1 25	1 23	1 25	1 27	1 30	1 34	1 38	1 43	1 49	1 54	14
15	2 18	2 1	1 50	1 42	1 36	1 31	1 27	1 24	1 23	1 25	1 27	1 30	1 34	1 38	1 43	1 48	15
16	2 26	2 7	1 55	1 46	1 39	1 34	1 29	1 25	1 22	1 23	1 25	1 27	1 30	1 34	1 38	1 43	16
17	2 34	2 13	2 0	1 50	1 43	1 37	1 31	1 26	1 22	1 22	1 23	1 25	1 28	1 31	1 34	1 38	17
18	2 42	2 20	2 5	1 54	1 46	1 40	1 34	1 27	1 23	1 21	1 22	1 23	1 25	1 28	1 31	1 34	18
19	2 50	2 27	2 11	1 59	1 50	1 43	1 36	1 29	1 24	1 22	1 21	1 22	1 23	1 26	1 28	1 31	19
20	2 59	2 34	2 17	2 4	1 54	1 46	1 39	1 31	1 25	1 22	1 20	1 21	1 22	1 24	1 26	1 28	20
21	3 7	2 41	2 23	2 9	1 58	1 50	1 42	1 33	1 26	1 23	1 21	1 20	1 21	1 22	1 24	1 25	21
22	3 15	2 48	2 29	2 14	2 2	1 53	1 45	1 35	1 28	1 24	1 21	1 20	1 20	1 21	1 22	1 23	22
23	3 24	2 55	2 35	2 19	2 7	1 57	1 48	1 37	1 30	1 25	1 22	1 20	1 20	1 20	1 21	1 22	23
24	3 32	3 2	2 41	2 24	2 10	2 1	1 52	1 40	1 31	1 26	1 23	1 21	1 20	1 20	1 20	1 21	24
25	3 41	3 9	2 47	2 29	2 15	2 4	1 55	1 42	1 33	1 27	1 24	1 22	1 20	1 19	1 19	1 20	25
26	3 49	3 16	2 53	2 34	2 20	2 8	1 59	1 45	1 35	1 29	1 25	1 22	1 20	1 19	1 19	1 19	26
27	3 58	3 23	2 59	2 39	2 25	2 12	2 3	1 48	1 38	1 31	1 26	1 23	1 21	1 19	1 19	1 19	27
28	4 6	3 30	3 5	2 44	2 29	2 16	2 7	1 51	1 40	1 32	1 27	1 23	1 21	1 19	1 18	1 18	28
29	4 15	3 37	3 11	2 49	2 33	2 20	2 11	1 53	1 42	1 34	1 28	1 24	1 21	1 19	1 18	1 18	29
30	4 23	3 44	3 17	2 54	2 38	2 24	2 14	1 56	1 44	1 35	1 29	1 24	1 21	1 19	1 18	1 18	30
31	4 31	3 51	3 23	2 59	2 42	2 28	2 18	1 59	1 46	1 37	1 30	1 25	1 22	1 20	1 18	1 18	31
32	4 39	3 58	3 29	3 4	2 47	2 32	2 21	2 2	1 48	1 38	1 31	1 26	1 22	1 20	1 19	1 18	32
33	4 47	4 5	3 34	3 9	2 52	2 36	2 25	2 5	1 51	1 40	1 33	1 27	1 23	1 20	1 19	1 18	33
34	4 55	4 12	3 40	3 14	2 56	2 40	2 28	2 8	1 53	1 41	1 34	1 28	1 24	1 21	1 19	1 18	34
35	5 3	4 18	3 46	3 19	3 0	2 44	2 32	2 11	1 55	1 43	1 35	1 29	1 25	1 22	1 20	1 18	35
36	5 10	4 24	3 52	3 24	3 4	2 48	2 35	2 14	1 57	1 45	1 37	1 31	1 26	1 22	1 20	1 18	36
37	5 18	4 31	3 58	3 29	3 8	2 52	2 39	2 17	1 59	1 47	1 38	1 32	1 27	1 23	1 21	1 19	37
38	5 25	4 38	4 4	3 34	3 12	2 55	2 42	2 20	2 1	1 49	1 40	1 33	1 28	1 24	1 21	1 19	38
39	5 32	4 45	4 10	3 39	3 17	2 59	2 46	2 22	2 4	1 51	1 42	1 35	1 29	1 25	1 22	1 20	39
40	5 39	4 51	4 15	3 44	3 21	3 3	2 49	2 25	2 6	1 53	1 43	1 36	1 30	1 26	1 22	1 20	40
41	5 46	4 57	4 21	3 49	3 26	3 7	2 52	2 27	2 8	1 55	1 45	1 37	1 31	1 27	1 23	1 20	41
42	5 53	5 3	4 26	3 53	3 30	3 11	2 55	2 30	2 10	1 56	1 46	1 38	1 32	1 28	1 24	1 21	42
43	6 0	5 9	4 31	3 58	3 35	3 15	2 58	2 32	2 13	1 58	1 48	1 40	1 34	1 29	1 25	1 22	43
44	6 7	5 15	4 36	4 3	3 39	3 19	3 1	2 35	2 15	2 0	1 49	1 41	1 35	1 30	1 26	1 22	44
46	6 21	5 26	4 46	4 12	3 47	3 26	3 7	2 40	2 19	2 4	1 52	1 43	1 37	1 31	1 27	1 23	46
48	6 34	5 37	4 55	4 20	3 54	3 32	3 13	2 45	2 23	2 8	1 56	1 46	1 39	1 33	1 28	1 24	48
50	6 47	5 48	5 4	4 28	4 1	3 37	3 19	2 50	2 27	2 11	1 59	1 48	1 41	1 35	1 29	1 25	50
52	6 59	5 58	5 13	4 36	4 8	3 43	3 25	2 55	2 31	2 14	2 2	1 51	1 43	1 36	1 31	1 27	52
54	7 11	6 8	5 22	4 44	4 15	3 49	3 30	2 59	2 35	2 18	2 4	1 53	1 45	1 38	1 33	1 28	54
56	7 22	6 17	5 30	4 51	4 21	3 55	3 35	3 4	2 38	2 21	2 7	1 56	1 47	1 40	1 34	1 29	56
58	7 31	6 25	5 37	4 58	4 27	4 1	3 40	3 8	2 41	2 24	2 10	1 58	1 49	1 41	1 35	1 30	58
60	7 40	6 32	5 45	5 4	4 32	4 6	3 45	3 12	2 44	2 27	2 12	2 0	1 50	1 42	1 36	1 31	60
62	7 48	6 39	5 52	5 10	4 38	4 11	3 50	3 16	2 48	2 29	2 14	2 2	1 52	1 44	1 37	1 32	62
64	7 56	6 46	5 58	5 15	4 43	4 15	3 55	3 19	2 51	2 31	2 16	2 4	1 53	1 45	1 38	1 33	64
66	8 3	6 53	6 2	5 20	4 47	4 19	3 59	3 22	2 54	2 33	2 18	2 5	1 55	1 46	1 39	1 34	66
68	8 10	6 59	6 6	5 24	4 51	4 23	4 2	3 25	2 56	2 35	2 19	2 6	1 56	1 47	1 40	1 34	68
70			6 10	5 27	4 54	4 26	4 4	3 27	2 58	2 36	2 20	2 7	1 57	1 48	1 41	1 35	70
72					4 57	4 29	4 6	3 28	3 0	2 38	2 21	2 8	1 58	1 49	1 41	1 35	72
74							4 8	3 29	3 2	2 39	2 22	2 9	1 59	1 50	1 42	1 36	74
76								3 30	3 3	2 41	2 23	2 10	1 59	1 50	1 42	1 36	76
78									3 4	2 42	2 24	2 11	2 0	1 51	1 43	1 37	78
80									2 43	2 25	2 12	2 1	1 51	1 43	1 37	80	
82										2 26	2 12	2 1	1 52	1 44	1 38	82	
84											2 12	2 2	1 52	1 44	1 38	84	
86												2 2	1 52	1 44	1 38	86	
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	

TABLE XVIII.

THIRD CORRECTION to APPARENT DISTANCE 60°.

D's App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																								D's App Alt.
	32°		34°		36°		38°		42°		46°		50°		54°		58°		62°		66°		70°		74°		78°		82°		86°		
°	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	°
6	4	32	4	48	5	3	5	19	5	49	6	17	6	44	7	7	7	28	7	47	8	3											6
7	3	51	4	5	4	19	4	32	4	58	5	22	5	44	6	4	6	22	6	38	6	53											7
8	3	23	3	35	3	47	3	59	4	22	4	42	5	1	5	19	5	35	5	50	6	2	6	13									8
9	3	0	3	10	3	20	3	30	3	49	4	8	4	25	4	41	4	55	5	8	5	19	5	30									9
10	2	43	2	51	3	0	3	9	3	26	3	42	3	58	4	12	4	24	4	35	4	45	4	54									10
11	2	29	2	37	2	44	2	52	3	7	3	21	3	35	3	48	3	59	4	9	4	18	4	26									11
12	2	18	2	25	2	32	2	39	2	52	3	5	3	17	3	29	3	39	3	48	3	56	4	3	4	8							12
13	2	8	2	15	2	21	2	28	2	39	2	51	3	2	3	12	3	21	3	30	3	38	3	44	3	48							13
14	2	0	2	6	2	12	2	18	2	28	2	38	2	48	2	57	3	6	3	14	3	21	3	26	3	29							14
15	1	53	1	58	2	3	2	8	2	18	2	27	2	36	2	45	2	53	3	0	3	6	3	11	3	15							15
16	1	47	1	51	1	55	2	0	2	9	2	18	2	26	2	34	2	41	2	48	2	53	2	58	3	2	3	6					16
17	1	42	1	45	1	49	1	53	2	1	2	9	2	17	2	24	2	31	2	37	2	42	2	46	2	50	2	53					17
18	1	37	1	40	1	44	1	47	1	54	2	1	2	9	2	16	2	22	2	27	2	32	2	36	2	40	2	42					18
19	1	33	1	36	1	39	1	42	1	48	1	55	2	2	2	9	2	15	2	19	2	24	2	28	2	31	2	33					19
20	1	30	1	32	1	35	1	38	1	44	1	50	1	56	2	2	2	8	2	12	2	16	2	20	2	23	2	25	2	27			20
21	1	27	1	29	1	32	1	35	1	40	1	46	1	51	1	56	2	1	2	6	2	10	2	13	2	15	2	17	2	19			21
22	1	25	1	27	1	29	1	32	1	37	1	42	1	47	1	51	1	56	2	0	2	4	2	6	2	8	2	10	2	12			22
23	1	23	1	25	1	27	1	30	1	34	1	38	1	43	1	47	1	51	1	55	1	59	2	1	2	3	2	4	2	6			23
24	1	22	1	23	1	25	1	27	1	31	1	35	1	40	1	44	1	47	1	51	1	54	1	56	1	58	1	59	2	1	2	3	24
25	1	21	1	22	1	23	1	25	1	29	1	32	1	36	1	40	1	43	1	47	1	49	1	51	1	53	1	54	1	56	1	57	25
26	1	20	1	21	1	22	1	23	1	26	1	29	1	33	1	37	1	40	1	43	1	45	1	47	1	49	1	50	1	51	1	52	26
27	1	19	1	20	1	21	1	22	1	24	1	27	1	30	1	34	1	37	1	40	1	42	1	43	1	45	1	46	1	47	1	48	27
28	1	19	1	19	1	20	1	21	1	23	1	25	1	28	1	31	1	34	1	37	1	39	1	40	1	41	1	42	1	43	1	44	28
29	1	18	1	18	1	19	1	20	1	22	1	23	1	26	1	29	1	31	1	34	1	36	1	37	1	38	1	39	1	40	1	41	29
30	1	18	1	18	1	18	1	19	1	20	1	22	1	24	1	27	1	29	1	31	1	33	1	34	1	35	1	36	1	37	1	38	30
31	1	18	1	18	1	18	1	18	1	19	1	20	1	22	1	25	1	27	1	29	1	30	1	31	1	32	1	33	1	34	1	35	31
32	1	17	1	17	1	17	1	17	1	18	1	19	1	21	1	23	1	25	1	27	1	28	1	29	1	30	1	31	1	31	1	32	32
33	1	17	1	16	1	16	1	16	1	17	1	18	1	19	1	21	1	23	1	25	1	26	1	27	1	28	1	29	1	29	1	30	33
34	1	17	1	16	1	16	1	16	1	16	1	17	1	18	1	20	1	22	1	23	1	24	1	25	1	26	1	27	1	27	1	28	34
35	1	17	1	16	1	16	1	16	1	16	1	16	1	17	1	18	1	20	1	21	1	22	1	23	1	24	1	25	1	25	1	26	35
36	1	17	1	16	1	15	1	16	1	16	1	16	1	16	1	17	1	18	1	19	1	20	1	21	1	22	1	23	1	23	1	24	36
37	1	17	1	16	1	15	1	15	1	15	1	15	1	15	1	16	1	17	1	18	1	19	1	20	1	21	1	21	1	22			37
38	1	17	1	16	1	15	1	14	1	14	1	14	1	14	1	15	1	16	1	17	1	18	1	19	1	20	1	20	1	21			38
39	1	18	1	16	1	15	1	14	1	13	1	13	1	13	1	14	1	15	1	16	1	17	1	17	1	18	1	18	1	19			39
40	1	18	1	16	1	15	1	14	1	13	1	13	1	13	1	14	1	14	1	15	1	16	1	16	1	17	1	17	1	17			40
41	1	18	1	16	1	15	1	14	1	12	1	12	1	12	1	13	1	13	1	14	1	15	1	15	1	16	1	16					41
42	1	18	1	16	1	15	1	14	1	12	1	12	1	12	1	12	1	12	1	13	1	14	1	14	1	15	1	15					42
43	1	19	1	17	1	16	1	14	1	12	1	11	1	11	1	11	1	11	1	11	1	12	1	13	1	13	1	14	1	14			43
44	1	19	1	17	1	16	1	14	1	12	1	11	1	11	1	11	1	11	1	11	1	12	1	12	1	13	1	13					44
46	1	20	1	18	1	16	1	14	1	12	1	11	1	10	1	10	1	10	1	10	1	11	1	11	1	11	1	11					46
48	1	21	1	19	1	17	1	15	1	12	1	10	1	9	1	9	1	9	1	9	1	10	1	10	1	10							48
50	1	22	1	19	1	17	1	15	1	12	1	10	1	9	1	8	1	8	1	8	1	8	1	8									50
52	1	23	1	20	1	17	1	15	1	12	1	10	1	8	1	8	1	8	1	7	1	7	1	7									52
54	1	24	1	21	1	18	1	16	1	13	1	10	1	8	1	7	1	7	1	6	1	6											54
56	1	25	1	22	1	19	1	16	1	13	1	10	1	8	1	7	1	7	1	6	1	6											56
58	1	26	1	23	1	20	1	17	1	13	1	10	1	8	1	7	1	6	1	5													58
60	1	27	1	24	1	21	1	18	1	14	1	10	1	8	1	7	1	6	1	5													60
62	1	28	1	24	1	21	1	18	1	14	1	10	1	8	1	6	1	5															62
64	1	29	1	25	1	21	1	18	1	14	1	10	1	8	1	6	1	5															64
66	1	29	1	25	1	21	1	18	1	14	1	11	1	8	1	6																	66
68	1	29	1	25	1	22	1	19	1	15	1	11	1	8	1	6																	68
70	1	30	1	26	1	22	1	19	1	15	1	11	1	8																			70
72	1	30	1	26	1	23	1	20	1	15	1	11	1	8																			72
74	1	31	1	27	1	23	1	20	1	15	1	11																					74
76	1	31	1	27	1	23	1	20	1	15	1	11																					76
78	1	32	1	28	1	24	1	20	1	15																							78
80	1	32	1	28	1	24	1	21	1	15																							80
82	1	33	1	28	1	24	1	21																									82
84	1	33	1	28	1	24	1	21																									84
86	1	33	1	28	1	24																											86
	32°		34°		36°		38°		42°		46°		50°		54°		58°		62°		66°												

TABLE P. EFFECT OF SUN'S PAR.

Add the Numbers above the lines to 3rd Correction, subtract the others.

D's App Alt.	Sun's Apparent Altitude.								
	5	10	20	30	40	50	60	70	80	90
	″	″	″	″	″	″	″	″	″	″
5	0	0	1	2	3	3	4			
10	1	1	0	1	2	2	3	3		
20	3	3	2	1	0	0	1	1	2	
30	5	4	3	3	2	2	1	1	0	
40	6	6	5	4	3	3	2	2	2	
50	7	7	6	5	5	4	3	3		
60	8	8	7	6	6	5	4			
70		9	8	7	6	6				
80			8	8	7					
90				8						

TABLE XVIII.

Third Correction to Apparent Distance 64°.

D's App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR																	D's App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°		
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	1 20	1 27	1 29	1 32	1 36	1 42	1 49	2 3	2 19	2 35	2 51	3 8	3 24	3 40	3 56	4 12	6
7	1 28	1 26	1 27	1 29	1 32	1 35	1 40	1 51	2 3	2 15	2 28	2 42	2 56	3 9	3 22	3 36	7
8	1 32	1 28	1 26	1 27	1 29	1 31	1 34	1 42	1 51	2 2	2 13	2 24	2 36	2 48	3 0	3 11	8
9	1 37	1 31	1 28	1 26	1 27	1 28	1 30	1 36	1 43	1 52	2 1	2 10	2 20	2 31	2 41	2 51	9
10	1 43	1 35	1 30	1 27	1 26	1 27	1 28	1 32	1 37	1 44	1 51	1 59	2 8	2 17	2 26	2 35	10
11	1 50	1 40	1 33	1 29	1 27	1 26	1 27	1 29	1 33	1 38	1 44	1 51	1 59	2 7	2 14	2 22	11
12	1 57	1 45	1 37	1 32	1 29	1 27	1 26	1 28	1 30	1 34	1 38	1 44	1 51	1 58	2 5	2 12	12
13	2 4	1 50	1 41	1 35	1 31	1 29	1 27	1 27	1 28	1 31	1 34	1 38	1 44	1 50	1 57	2 3	13
14	2 12	1 56	1 46	1 39	1 34	1 31	1 29	1 26	1 27	1 29	1 31	1 34	1 39	1 44	1 50	1 55	14
15	2 20	2 2	1 51	1 43	1 37	1 33	1 30	1 27	1 26	1 27	1 29	1 31	1 35	1 40	1 44	1 49	15
16	2 27	2 8	1 56	1 47	1 41	1 36	1 32	1 28	1 25	1 26	1 27	1 29	1 32	1 36	1 40	1 44	16
17	2 35	2 14	2 1	1 51	1 45	1 39	1 34	1 29	1 26	1 25	1 26	1 28	1 30	1 33	1 36	1 40	17
18	2 43	2 21	2 6	1 56	1 48	1 42	1 37	1 31	1 27	1 25	1 25	1 26	1 28	1 30	1 33	1 36	18
19	2 51	2 27	2 12	2 0	1 52	1 45	1 39	1 32	1 28	1 25	1 25	1 25	1 27	1 28	1 30	1 33	19
20	2 59	2 34	2 17	2 5	1 56	1 49	1 42	1 34	1 29	1 26	1 24	1 24	1 25	1 26	1 28	1 30	20
21	3 7	2 41	2 23	2 10	2 0	1 52	1 45	1 36	1 30	1 26	1 24	1 23	1 24	1 25	1 26	1 28	21
22	3 15	2 48	2 29	2 15	2 4	1 55	1 48	1 38	1 31	1 27	1 25	1 23	1 23	1 24	1 25	1 26	22
23	3 23	2 55	2 35	2 20	2 8	1 59	1 51	1 40	1 33	1 28	1 25	1 23	1 23	1 24	1 24	1 25	23
24	3 31	3 2	2 41	2 25	2 12	2 2	1 54	1 42	1 34	1 29	1 26	1 24	1 23	1 23	1 24	1 25	24
25	3 39	3 8	2 47	2 30	2 17	2 6	1 57	1 44	1 36	1 30	1 26	1 24	1 23	1 23	1 23	1 24	25
26	3 47	3 15	2 53	2 35	2 21	2 10	2 0	1 47	1 38	1 32	1 27	1 25	1 23	1 23	1 23	1 23	26
27	3 56	3 22	2 59	2 40	2 26	2 14	2 4	1 50	1 40	1 33	1 28	1 25	1 23	1 23	1 22	1 23	27
28	4 4	3 29	3 5	2 45	2 30	2 18	2 7	1 53	1 42	1 35	1 29	1 26	1 24	1 23	1 22	1 22	28
29	4 12	3 36	3 11	2 50	2 35	2 22	2 11	1 55	1 44	1 36	1 30	1 27	1 25	1 23	1 22	1 22	29
30	4 20	3 42	3 17	2 55	2 39	2 26	2 15	1 58	1 46	1 38	1 32	1 28	1 25	1 24	1 23	1 22	30
31	4 28	3 49	3 23	3 0	2 43	2 30	2 18	2 0	1 48	1 40	1 33	1 29	1 26	1 24	1 23	1 22	31
32	4 36	3 55	3 28	3 5	2 48	2 34	2 22	2 3	1 50	1 41	1 34	1 30	1 26	1 24	1 23	1 22	32
33	4 44	4 2	3 34	3 10	2 52	2 38	2 26	2 6	1 53	1 43	1 36	1 30	1 27	1 24	1 23	1 22	33
34	4 52	4 8	3 39	3 15	2 56	2 41	2 29	2 8	1 55	1 44	1 37	1 31	1 28	1 25	1 23	1 22	34
35	5 0	4 15	3 45	3 20	3 1	2 45	2 33	2 11	1 57	1 46	1 38	1 32	1 28	1 25	1 23	1 22	35
36	5 7	4 21	3 51	3 25	3 5	2 49	2 36	2 14	1 59	1 47	1 39	1 33	1 29	1 26	1 24	1 23	36
37	5 14	4 28	3 57	3 30	3 9	2 53	2 40	2 17	2 2	1 49	1 41	1 34	1 30	1 27	1 25	1 23	37
38	5 21	4 34	4 2	3 35	3 14	2 57	2 43	2 20	2 4	1 52	1 43	1 36	1 31	1 27	1 25	1 23	38
39	5 28	4 41	4 7	3 39	3 18	3 1	2 46	2 23	2 6	1 54	1 45	1 37	1 32	1 28	1 25	1 23	39
40	5 35	4 47	4 12	3 44	3 22	3 4	2 49	2 26	2 9	1 56	1 46	1 38	1 33	1 29	1 26	1 24	40
41	5 42	4 53	4 17	3 49	3 26	3 8	2 52	2 29	2 11	1 58	1 48	1 40	1 34	1 29	1 26	1 24	41
42	5 49	4 59	4 22	3 53	3 30	3 11	2 55	2 31	2 13	2 0	1 49	1 41	1 35	1 30	1 27	1 24	42
43	5 56	5 5	4 27	3 58	3 34	3 15	2 59	2 34	2 15	2 2	1 51	1 42	1 36	1 31	1 28	1 25	43
44	6 2	5 11	4 32	4 3	3 38	3 19	3 2	2 36	2 17	2 3	1 52	1 44	1 38	1 32	1 29	1 26	44
46	6 15	5 21	4 42	4 11	3 45	3 26	3 8	2 41	2 22	2 6	1 55	1 47	1 40	1 34	1 30	1 27	46
48	6 28	5 32	4 52	4 19	3 53	3 32	3 14	2 45	2 26	2 10	1 58	1 49	1 42	1 36	1 32	1 28	48
50	6 40	5 42	5 1	4 27	4 0	3 38	3 20	2 50	2 29	2 14	2 1	1 51	1 44	1 37	1 33	1 29	50
52	6 52	5 52	5 10	4 35	4 7	3 44	3 25	2 55	2 33	2 17	2 4	1 54	1 46	1 39	1 34	1 30	52
54	7 3	6 1	5 18	4 42	4 14	3 50	3 30	2 59	2 37	2 20	2 7	1 56	1 48	1 41	1 35	1 31	54
56	7 14	6 10	5 26	4 49	4 20	3 55	3 35	3 3	2 41	2 23	2 9	1 58	1 49	1 43	1 37	1 32	56
58	7 24	6 18	5 34	4 56	4 25	4 0	3 39	3 7	2 44	2 26	2 11	2 0	1 52	1 45	1 38	1 33	58
60	7 32	6 26	5 41	5 2	4 30	4 5	3 44	3 11	2 47	2 29	2 14	2 2	1 54	1 47	1 40	1 35	60
62	7 40	6 33	5 47	5 7	4 35	4 10	3 49	3 15	2 50	2 31	2 16	2 4	1 55	1 48	1 41	1 36	62
64	7 48	6 40	5 53	5 12	4 40	4 15	3 53	3 19	2 52	2 34	2 19	2 6	1 56	1 49	1 42	1 37	64
66	7 55	6 47	5 59	5 17	4 45	4 19	3 57	3 22	2 54	2 36	2 21	2 8	1 57	1 50	1 43	1 38	66
68	8 1	6 53	6 4	5 22	4 49	4 23	4 1	3 24	2 56	2 38	2 22	2 9	1 59	1 51	1 44	1 38	68
70	8 7	6 59	6 8	5 26	4 53	4 26	4 4	3 26	2 58	2 40	2 23	2 10	2 0	1 52	1 45	1 39	70
72	8 12	7 4	6 11	5 30	4 56	4 29	4 6	3 28	3 0	2 41	2 24	2 11	2 1	1 53	1 46	1 39	72
74			6 14	5 33	4 59	4 31	4 8	3 30	3 2	2 42	2 25	2 12	2 2	1 54	1 47	1 40	74
76					5 1	4 33	4 9	3 32	3 4	2 43	2 26	2 13	2 3	1 54	1 47	1 40	76
78							4 10	3 33	3 6	2 44	2 27	2 14	2 3	1 54	1 47	1 41	78
80								3 34	3 7	2 45	2 28	2 15	2 4	1 55	1 47	1 41	80
82									3 8	2 46	2 29	2 16	2 4	1 55	1 48	1 42	82
84										2 47	2 29	2 16	2 5	1 56	1 49	1 42	84
86											2 29	2 16	2 6	1 56	1 49	1 42	86
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	

TABLE XVIII.

THIRD CORRECTION, to APPARENT DISTANCE 64°.

D's App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																		D's App Alt.
°	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°			°
6	4 29	4 45	5 0	5 15	5 43	6 10	6 36	6 59	7 20	7 39	7 54	8 7							6
7	3 49	4 2	4 15	4 28	4 53	5 16	5 37	5 57	6 15	6 32	6 46	6 59							7
8	3 22	3 34	3 45	3 56	4 18	4 38	4 57	5 15	5 31	5 46	5 58	6 7	6 16						8
9	3 0	3 10	3 20	3 30	3 49	4 7	4 23	4 38	4 52	5 5	5 16	5 26	5 34						9
10	2 43	2 52	3 1	3 10	3 27	3 42	3 56	4 9	4 21	4 32	4 42	4 51	4 59						10
11	2 30	2 37	2 45	2 54	3 9	3 22	3 35	3 47	3 57	4 7	4 16	4 24	4 31						11
12	2 19	2 25	2 33	2 40	2 53	3 5	3 17	3 27	3 37	3 47	3 56	4 3	4 8	4 13					12
13	2 9	2 15	2 22	2 28	2 40	2 51	3 1	3 11	3 20	3 29	3 37	3 43	3 47	3 51					13
14	2 1	2 7	2 13	2 18	2 29	2 39	2 48	2 57	3 6	3 14	3 20	3 25	3 29	3 33					14
15	1 54	2 0	2 5	2 10	2 19	2 29	2 37	2 45	2 53	3 0	3 5	3 10	3 14	3 18					15
16	1 48	1 53	1 58	2 3	2 11	2 20	2 28	2 35	2 42	2 48	2 53	2 57	3 1	3 5	3 8				16
17	1 43	1 47	1 52	1 56	2 4	2 12	2 20	2 26	2 32	2 38	2 43	2 47	2 51	2 54	2 56				17
18	1 39	1 43	1 47	1 50	1 58	2 5	2 12	2 18	2 24	2 30	2 35	2 39	2 42	2 44	2 46				18
19	1 36	1 39	1 42	1 46	1 52	1 59	2 5	2 11	2 17	2 22	2 27	2 31	2 34	2 36	2 38				19
20	1 33	1 36	1 38	1 42	1 48	1 54	1 59	2 5	2 11	2 15	2 20	2 23	2 26	2 28	2 30	2 32			20
21	1 30	1 33	1 35	1 38	1 44	1 49	1 54	2 0	2 5	2 9	2 13	2 16	2 18	2 20	2 22	2 23			21
22	1 28	1 30	1 33	1 35	1 40	1 45	1 50	1 55	1 59	2 3	2 6	2 9	2 11	2 13	2 15	2 16			22
23	1 27	1 28	1 30	1 32	1 37	1 41	1 46	1 51	1 54	1 58	2 1	2 3	2 5	2 7	2 9	2 10			23
24	1 26	1 27	1 28	1 30	1 34	1 38	1 42	1 47	1 50	1 54	1 57	1 59	2 0	2 2	2 4	2 5			24
25	1 25	1 26	1 27	1 28	1 32	1 35	1 39	1 43	1 47	1 50	1 53	1 55	1 56	1 58	1 59	2 0			25
26	1 24	1 25	1 26	1 27	1 30	1 33	1 36	1 40	1 44	1 47	1 49	1 51	1 52	1 54	1 55	1 56			26
27	1 23	1 24	1 25	1 26	1 28	1 31	1 34	1 37	1 41	1 44	1 46	1 47	1 49	1 50	1 51	1 52			27
28	1 23	1 23	1 24	1 25	1 26	1 29	1 32	1 35	1 38	1 41	1 43	1 44	1 45	1 46	1 47	1 48			28
29	1 22	1 22	1 23	1 24	1 25	1 27	1 30	1 32	1 35	1 38	1 40	1 41	1 42	1 43	1 44	1 45			29
30	1 22	1 22	1 23	1 23	1 24	1 26	1 28	1 30	1 33	1 35	1 37	1 38	1 39	1 40	1 41	1 42			30
31	1 22	1 22	1 22	1 22	1 23	1 24	1 26	1 28	1 31	1 33	1 34	1 35	1 36	1 37	1 38	1 40			31
32	1 21	1 21	1 21	1 21	1 22	1 23	1 25	1 27	1 29	1 31	1 32	1 33	1 34	1 35	1 36	1 38			32
33	1 21	1 21	1 21	1 21	1 21	1 22	1 24	1 26	1 27	1 29	1 30	1 31	1 32	1 33	1 34				33
34	1 21	1 20	1 20	1 20	1 20	1 21	1 23	1 25	1 26	1 27	1 28	1 29	1 30	1 31	1 32				34
35	1 21	1 20	1 20	1 20	1 20	1 21	1 22	1 23	1 24	1 25	1 26	1 27	1 28	1 29	1 30				35
36	1 21	1 20	1 19	1 19	1 19	1 20	1 21	1 22	1 23	1 24	1 25	1 26	1 26	1 27	1 28				36
37	1 21	1 20	1 19	1 19	1 19	1 19	1 20	1 21	1 22	1 23	1 24	1 25	1 25	1 26					37
38	1 21	1 20	1 19	1 18	1 18	1 18	1 19	1 20	1 21	1 22	1 23	1 24	1 24	1 25					38
39	1 21	1 20	1 19	1 18	1 18	1 18	1 18	1 19	1 20	1 21	1 21	1 22	1 22	1 23					39
40	1 22	1 20	1 19	1 18	1 17	1 17	1 18	1 18	1 19	1 20	1 20	1 21	1 21	1 22					40
41	1 22	1 20	1 19	1 18	1 17	1 17	1 17	1 17	1 18	1 19	1 19	1 20	1 20						41
42	1 22	1 20	1 19	1 18	1 16	1 16	1 16	1 17	1 17	1 18	1 18	1 19	1 19						42
43	1 23	1 21	1 19	1 18	1 16	1 16	1 16	1 16	1 16	1 17	1 17	1 18	1 18						43
44	1 23	1 21	1 19	1 18	1 16	1 16	1 16	1 16	1 16	1 16	1 16	1 17	1 17						44
46	1 24	1 22	1 20	1 18	1 16	1 15	1 15	1 15	1 15	1 15	1 15	1 16							46
48	1 25	1 22	1 20	1 19	1 16	1 15	1 15	1 14	1 14	1 14	1 14	1 14							48
50	1 26	1 23	1 21	1 19	1 16	1 15	1 14	1 13	1 13	1 13	1 13								50
52	1 27	1 24	1 22	1 20	1 17	1 15	1 13	1 12	1 12	1 12	1 12								52
54	1 28	1 25	1 22	1 20	1 17	1 15	1 13	1 12	1 11	1 11									54
56	1 29	1 26	1 23	1 21	1 17	1 15	1 13	1 12	1 11	1 11									56
58	1 29	1 26	1 23	1 21	1 18	1 15	1 13	1 11	1 10										58
60	1 30	1 27	1 24	1 22	1 18	1 15	1 13	1 11	1 10										60
62	1 31	1 28	1 25	1 22	1 18	1 15	1 13	1 11											62
64	1 32	1 28	1 25	1 22	1 18	1 15	1 13	1 11											64
66	1 33	1 29	1 26	1 23	1 18	1 16	1 13												66
68	1 33	1 29	1 26	1 23	1 19	1 16	1 13												68
70	1 34	1 30	1 27	1 24	1 19	1 16													70
72	1 34	1 30	1 27	1 24	1 19	1 16													72
74	1 35	1 31	1 28	1 24	1 19														74
76	1 35	1 31	1 28	1 25	1 20														76
78	1 36	1 32	1 28	1 25															78
80	1 36	1 32	1 28	1 25															80
82	1 37	1 32	1 28																82
84	1 37	1 32																	84
86	1 37																		86
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°								

TABLE P. EFFECT OF SUN'S PAR.

Add the Numbers above the lines to 3rd Correction, subtract the others.

D's App Alt.	Sun's Apparent Altitude.								
	5	10	20	30	40	50	60	70	80	90
	″	″	″	″	″	″	″	″	″	″
5	0	0	1	2	3	3	3			
10	1	1	0	1	2	2	2			
20	2	2	2	1	1	0	0	1	1	
30	5	4	3	3	2	2	1	1	1	0
40	6	6	5	4	4	3	3	2	2	
50	7	7	6	5	5	4	4	3	4	
60	8	8	7	6	6	6	5	5		
70	9	9	8	8	7	7	6			
80					8	8	7			
90						8				

TABLE XVIII

THIRD CORRECTION, to APPARENT DISTANCE 68°

D's App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.															D's App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	1 29	1 31	1 34	1 37	1 41	1 46	1 52	2 6	2 21	2 36	2 52	3 8	3 24	3 39	3 54	4 10	6
7	1 32	1 29	1 31	1 33	1 36	1 39	1 43	1 54	2 5	2 17	2 30	2 43	2 56	3 9	3 22	3 36	7
8	1 36	1 31	1 29	1 30	1 32	1 34	1 37	1 45	1 54	2 4	2 14	2 25	2 37	2 48	2 59	3 11	8
9	1 41	1 34	1 31	1 29	1 30	1 31	1 33	1 38	1 46	1 54	2 3	2 12	2 22	2 32	2 42	2 52	9
10	1 46	1 38	1 33	1 30	1 29	1 30	1 31	1 34	1 40	1 47	1 54	2 2	2 10	2 19	2 28	2 36	10
11	1 52	1 43	1 36	1 32	1 30	1 29	1 30	1 32	1 36	1 41	1 47	1 54	2 1	2 9	2 16	2 24	11
12	1 59	1 48	1 40	1 35	1 32	1 30	1 29	1 30	1 33	1 37	1 42	1 48	1 54	2 0	2 7	2 14	12
13	2 6	1 53	1 44	1 38	1 34	1 32	1 30	1 29	1 31	1 34	1 38	1 43	1 48	1 53	1 59	2 5	13
14	2 14	1 59	1 49	1 42	1 37	1 34	1 31	1 29	1 30	1 32	1 35	1 39	1 44	1 48	1 53	1 58	14
15	2 21	2 5	1 54	1 46	1 40	1 36	1 33	1 30	1 30	1 31	1 33	1 36	1 40	1 44	1 48	1 53	15
16	2 28	2 11	1 59	1 50	1 44	1 39	1 35	1 31	1 29	1 30	1 32	1 34	1 37	1 40	1 44	1 48	16
17	2 36	2 17	2 4	1 54	1 47	1 42	1 38	1 32	1 29	1 29	1 30	1 32	1 34	1 37	1 40	1 44	17
18	2 44	2 24	2 10	1 59	1 51	1 45	1 40	1 34	1 30	1 28	1 29	1 30	1 32	1 35	1 37	1 40	18
19	2 52	2 30	2 15	2 4	1 55	1 48	1 43	1 35	1 31	1 28	1 28	1 29	1 31	1 33	1 35	1 37	19
20	3 0	2 36	2 21	2 8	1 59	1 52	1 46	1 37	1 32	1 29	1 28	1 29	1 30	1 31	1 33	1 35	20
21	3 8	2 43	2 26	2 13	2 3	1 55	1 48	1 39	1 33	1 30	1 28	1 28	1 29	1 30	1 31	1 33	21
22	3 15	2 49	2 32	2 17	2 7	1 58	1 51	1 41	1 35	1 31	1 29	1 27	1 28	1 29	1 30	1 31	22
23	3 23	2 56	2 37	2 22	2 11	2 2	1 54	1 43	1 37	1 32	1 29	1 27	1 27	1 28	1 29	1 30	23
24	3 31	3 3	2 43	2 27	2 15	2 5	1 57	1 46	1 39	1 34	1 30	1 28	1 27	1 28	1 28	1 29	24
25	3 39	3 9	2 48	2 32	2 19	2 9	2 0	1 48	1 41	1 35	1 31	1 29	1 27	1 27	1 27	1 28	25
26	3 47	3 16	2 54	2 37	2 23	2 12	2 4	1 51	1 43	1 36	1 32	1 30	1 28	1 27	1 27	1 27	26
27	3 55	3 23	3 0	2 42	2 27	2 16	2 7	1 54	1 44	1 37	1 33	1 30	1 28	1 27	1 26	1 27	27
28	4 2	3 29	3 5	2 47	2 31	2 19	2 10	1 56	1 46	1 39	1 34	1 31	1 29	1 27	1 26	1 26	28
29	4 10	3 36	3 11	2 52	2 35	2 23	2 14	1 59	1 48	1 41	1 35	1 32	1 29	1 27	1 26	1 26	29
30	4 17	3 42	3 16	2 57	2 40	2 27	2 17	2 1	1 50	1 42	1 36	1 32	1 29	1 27	1 26	1 26	30
31	4 25	3 49	3 22	3 2	2 44	2 31	2 20	2 3	1 52	1 43	1 37	1 33	1 30	1 28	1 27	1 26	31
32	4 32	3 55	3 27	3 7	2 49	2 34	2 23	2 6	1 54	1 45	1 38	1 33	1 30	1 28	1 27	1 26	32
33	4 40	4 2	3 33	3 12	2 53	2 38	2 26	2 9	1 56	1 47	1 39	1 34	1 31	1 29	1 27	1 26	33
34	4 48	4 8	3 39	3 16	2 57	2 42	2 30	2 12	1 58	1 48	1 41	1 35	1 32	1 30	1 28	1 26	34
35	4 55	4 15	3 45	3 21	3 2	2 46	2 34	2 15	2 0	1 50	1 43	1 37	1 33	1 30	1 28	1 26	35
36	5 2	4 21	3 50	3 26	3 6	2 50	2 37	2 17	2 3	1 52	1 44	1 38	1 34	1 31	1 28	1 26	36
37	5 10	4 27	3 56	3 30	3 10	2 53	2 41	2 20	2 5	1 54	1 46	1 39	1 35	1 31	1 28	1 26	37
38	5 17	4 33	4 1	3 35	3 14	2 57	2 44	2 22	2 7	1 56	1 48	1 41	1 36	1 32	1 29	1 27	38
39	5 24	4 39	4 6	3 40	3 18	3 1	2 47	2 25	2 9	1 58	1 50	1 43	1 37	1 33	1 30	1 27	39
40	5 31	4 45	4 11	3 45	3 22	3 5	2 50	2 27	2 11	2 0	1 51	1 44	1 38	1 34	1 31	1 28	40
41	5 38	4 51	4 16	3 49	3 26	3 9	2 53	2 30	2 14	2 2	1 53	1 45	1 39	1 35	1 31	1 28	41
42	5 44	4 57	4 21	3 53	3 30	3 12	2 56	2 32	2 16	2 4	1 54	1 46	1 40	1 36	1 32	1 29	42
43	5 50	5 2	4 26	3 58	3 34	3 16	2 59	2 34	2 19	2 6	1 56	1 48	1 41	1 37	1 33	1 30	43
44	5 57	5 8	4 31	4 2	3 38	3 19	3 3	2 37	2 21	2 8	1 57	1 49	1 43	1 38	1 34	1 31	44
46	6 10	5 19	4 41	4 10	3 46	3 26	3 9	2 42	2 25	2 11	1 59	1 51	1 45	1 40	1 35	1 31	46
48	6 22	5 29	4 50	4 18	3 53	3 32	3 15	2 47	2 29	2 14	2 2	1 54	1 47	1 41	1 36	1 32	48
50	6 34	5 39	4 59	4 26	3 59	3 38	3 21	2 52	2 33	2 18	2 5	1 56	1 49	1 43	1 38	1 33	50
52	6 45	5 48	5 7	4 33	4 6	3 44	3 26	2 56	2 36	2 21	2 8	1 58	1 51	1 45	1 39	1 35	52
54	6 56	5 57	5 14	4 40	4 12	3 50	3 31	3 0	2 39	2 24	2 11	2 0	1 52	1 46	1 40	1 36	54
56	7 6	6 6	5 21	4 46	4 18	3 55	3 36	3 4	2 42	2 27	2 14	2 2	1 54	1 47	1 41	1 37	56
58	7 15	6 14	5 28	4 52	4 24	4 0	3 41	3 8	2 45	2 29	2 16	2 4	1 56	1 49	1 43	1 38	58
60	7 24	6 22	5 35	4 58	4 29	4 5	3 45	3 12	2 48	2 32	2 18	2 6	1 58	1 51	1 45	1 39	60
62	7 33	6 29	5 42	5 3	4 34	4 10	3 49	3 15	2 51	2 34	2 20	2 8	1 59	1 52	1 46	1 40	62
64	7 41	6 35	5 48	5 8	4 39	4 14	3 53	3 18	2 54	2 36	2 22	2 10	2 1	1 53	1 47	1 41	64
66	7 48	6 41	5 53	5 13	4 43	4 18	3 57	3 21	2 56	2 38	2 24	2 12	2 2	1 54	1 48	1 42	66
68	7 55	6 47	5 58	5 17	4 47	4 22	4 0	3 24	2 59	2 40	2 26	2 14	2 3	1 55	1 49	1 43	68
70	8 1	6 52	6 3	5 21	4 51	4 25	4 3	3 27	3 1	2 42	2 27	2 15	2 4	1 56	1 50	1 44	70
72	8 7	6 57	6 8	5 25	4 55	4 28	4 6	3 30	3 3	2 44	2 28	2 15	2 5	1 57	1 51	1 45	72
74	8 12	7 1	6 12	5 29	4 58	4 30	4 8	3 32	3 5	2 45	2 29	2 16	2 5	1 57	1 51	1 45	74
76	8 17	7 5	6 15	5 32	5 1	4 32	4 10	3 34	3 7	2 46	2 30	2 17	2 6	1 58	1 51	1 45	76
78			6 18	5 35	5 3	4 34	4 12	3 35	3 9	2 47	2 31	2 18	2 7	1 58	1 52	1 46	78
80					5 5	4 36	4 13	3 36	3 10	2 48	2 32	2 18	2 7	1 59	1 52	1 46	80
82							4 14	3 37	3 11	2 49	2 32	2 19	2 8	1 59	1 52	1 46	82
84								3 38	3 11	2 50	2 33	2 20	2 9	2 0	1 53	1 46	84
86									3 12	2 50	2 33	2 20	2 9	2 0	1 53		86
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	

TABLE XVIII.

THIRD CORRECTION, to APPARENT DISTANCE 68°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																								☽'s App Alt.
	32°		34°		36°		38°		42°		46°		50°		54°		58°		62°		66°		70°		74°		78°		82°		86°	
°	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	°
6	4	25	4	40	4	55	5	11	5	40	6	5	6	29	6	51	7	11	7	29	7	45	8	0	8	14							6
7	3	49	4	1	4	14	4	27	4	52	5	15	5	35	5	53	6	10	6	25	6	38	6	50	7	1							7
8	3	22	3	33	3	44	3	55	4	17	4	37	4	55	5	11	5	25	5	38	5	51	6	2	6	10	6	18					8
9	3	1	3	11	3	21	3	30	3	48	4	6	4	22	4	36	4	49	5	0	5	10	5	19	5	28	5	36					9
10	2	44	2	53	3	2	3	10	3	25	3	41	3	55	4	9	4	21	4	31	4	40	4	49	4	57	5	3					10
11	2	31	2	39	2	47	2	54	3	8	3	22	3	35	3	47	3	58	4	8	4	16	4	23	4	29	4	34					11
12	2	20	2	27	2	34	2	41	2	53	3	6	3	18	3	29	3	39	3	48	3	55	4	2	4	7	4	11	4	15			12
13	2	11	2	17	2	23	2	29	2	41	2	52	3	2	3	12	3	22	3	30	3	37	3	43	3	48	3	52	3	56			13
14	2	3	2	9	2	14	2	19	2	30	2	40	2	49	2	58	3	6	3	14	3	20	3	26	3	31	3	35	3	38			14
15	1	57	2	2	2	6	2	11	2	21	2	30	2	38	2	46	2	54	3	1	3	7	3	12	3	16	3	20	3	23			15
16	1	52	1	56	2	0	2	4	2	13	2	21	2	29	2	37	2	44	2	50	2	55	3	0	3	4	3	8	3	10	3	12	16
17	1	47	1	51	1	55	1	58	2	6	2	14	2	21	2	29	2	35	2	40	2	45	2	49	2	53	2	57	2	59	3	0	17
18	1	43	1	47	1	50	1	54	2	1	2	8	2	14	2	21	2	27	2	32	2	36	2	40	2	44	2	47	2	49	2	50	18
19	1	40	1	43	1	46	1	50	1	56	2	2	2	8	2	15	2	20	2	25	2	29	2	32	2	36	2	39	2	41	2	42	19
20	1	37	1	40	1	43	1	46	1	52	1	57	2	3	2	9	2	14	2	18	2	22	2	25	2	28	2	31	2	33	2	34	20
21	1	35	1	37	1	40	1	43	1	48	1	53	1	58	2	3	2	8	2	12	2	16	2	19	2	21	2	23	2	25	2	26	21
22	1	33	1	35	1	37	1	40	1	44	1	49	1	54	1	58	2	2	2	6	2	10	2	13	2	15	2	17	2	19	2	20	22
23	1	31	1	33	1	35	1	37	1	41	1	46	1	50	1	54	1	57	2	1	2	5	2	8	2	10	2	12	2	14	2	15	23
24	1	30	1	31	1	33	1	35	1	39	1	43	1	47	1	50	1	53	1	57	2	0	2	3	2	5	2	7	2	9	2	10	24
25	1	29	1	30	1	31	1	33	1	37	1	40	1	44	1	47	1	50	1	53	1	56	1	59	2	1	2	2	2	4	2	5	25
26	1	28	1	29	1	30	1	32	1	35	1	38	1	41	1	44	1	47	1	50	1	53	1	55	1	57	1	58	1	59	2	0	26
27	1	27	1	28	1	29	1	30	1	33	1	36	1	38	1	41	1	44	1	47	1	50	1	52	1	53	1	54	1	55	1	56	27
28	1	27	1	27	1	28	1	29	1	31	1	34	1	36	1	39	1	41	1	44	1	47	1	49	1	50	1	51	1	52	1	52	28
29	1	26	1	26	1	27	1	28	1	29	1	32	1	34	1	37	1	39	1	41	1	44	1	46	1	47	1	48	1	49			29
30	1	26	1	26	1	26	1	27	1	28	1	30	1	32	1	35	1	37	1	39	1	41	1	43	1	44	1	45	1	46			30
31	1	25	1	25	1	26	1	26	1	27	1	29	1	31	1	33	1	35	1	37	1	39	1	40	1	41	1	42	1	43			31
32	1	25	1	25	1	25	1	25	1	26	1	28	1	29	1	31	1	33	1	35	1	37	1	38	1	39	1	40	1	41			32
33	1	25	1	24	1	25	1	25	1	26	1	27	1	28	1	30	1	31	1	33	1	35	1	36	1	37	1	38					33
34	1	25	1	24	1	24	1	24	1	25	1	26	1	27	1	29	1	30	1	31	1	33	1	34	1	35	1	36					34
35	1	25	1	24	1	24	1	24	1	24	1	25	1	26	1	28	1	29	1	30	1	31	1	32	1	33	1	34					35
36	1	25	1	24	1	23	1	23	1	23	1	24	1	25	1	27	1	28	1	29	1	30	1	30	1	31	1	32					36
37	1	25	1	24	1	23	1	23	1	23	1	23	1	24	1	26	1	27	1	28	1	29	1	29	1	30							37
38	1	25	1	24	1	23	1	22	1	22	1	23	1	24	1	25	1	26	1	27	1	28	1	28	1	29							38
39	1	25	1	24	1	23	1	22	1	22	1	23	1	23	1	24	1	25	1	26	1	27	1	27	1	27							39
40	1	26	1	25	1	24	1	23	1	22	1	22	1	23	1	23	1	24	1	25	1	26	1	26	1	26							40
41	1	26	1	25	1	24	1	23	1	21	1	21	1	22	1	22	1	23	1	24	1	25	1	25									41
42	1	27	1	25	1	24	1	23	1	21	1	21	1	21	1	22	1	23	1	23	1	24	1	24									42
43	1	27	1	25	1	24	1	23	1	21	1	21	1	21	1	21	1	22	1	22	1	23	1	23									43
44	1	28	1	26	1	24	1	23	1	21	1	20	1	20	1	20	1	21	1	21	1	22	1	22									44
46	1	28	1	26	1	25	1	24	1	21	1	19	1	19	1	19	1	20	1	20	1	20											46
48	1	29	1	27	1	25	1	24	1	22	1	19	1	18	1	18	1	19	1	19	1	19											48
50	1	30	1	28	1	26	1	25	1	22	1	20	1	18	1	18	1	18	1	18													50
52	1	31	1	29	1	27	1	25	1	22	1	20	1	18	1	17	1	17	1	17													52
54	1	32	1	29	1	27	1	26	1	23	1	20	1	18	1	17	1	16															54
56	1	33	1	30	1	28	1	26	1	23	1	20	1	18	1	16	1	15															56
58	1	34	1	31	1	29	1	27	1	23	1	20	1	18	1	16																	58
60	1	35	1	32	1	29	1	27	1	23	1	20	1	18	1	16																	60
62	1	36	1	33	1	30	1	28	1	23	1	20	1	18																			62
64	1	37	1	33	1	30	1	28	1	24	1	20	1	17																			64
66	1	38	1	34	1	31	1	28	1	24	1	20																					66
68	1	38	1	34	1	31	1	28	1	24	1	20																					68
70	1	39	1	35	1	32	1	29	1	24																							70
72	1	39	1	35	1	32	1	29	1	24																							72
74	1	40	1	36	1	32	1	29																									74
76	1	40	1	36	1	32	1	29																									76
78	1	41	1	36	1	32																											78
80	1	41	1	36																													80
82	1	41																															82
84																																	84
86																																	86
	32°		34°		36°		38°		42°		46°		50°		54°		58°		62°		66°											

TABLE P. EFFECT OF SUN'S PAR

Add the Numbers above the lines to 3rd Correction, subtract the others.

☽'s App Alt.	Sun's Apparent Altitude.								
	5′ ″	10′ ″	20′ ″	30′ ″	40′ ″	50′ ″	60′ ″	70′ ″	80′ ″	90′ ″
5	1	0	0	1	1	2	2	3		
10	2	1	0	0	1	1	1	2	2	
20	3	3	2	1	1	0	0	0	0	0
30	4	4	4	3	2	2	2	1	1	
40	6	6	5	4	4	3	3	2		
50	7	7	6	6	5	5	4			
60	8	8	7	7	6	6				
70	9	8	8	7	7					
80		9	8	8						
90				8						

Third Correction to Apparent Distance 72°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.															☽'s App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	1 33	1 35	1 37	1 40	1 44	1 50	1 56	2 9	2 23	2 38	2 53	3 9	3 24	3 40	3 56	4 12	6
7	1 35	1 33	1 34	1 36	1 39	1 43	1 47	1 56	2 8	2 21	2 34	2 47	3 0	3 12	3 25	3 38	7
8	1 39	1 35	1 33	1 34	1 36	1 38	1 41	1 48	1 58	2 8	2 19	2 30	2 41	2 52	3 3	3 14	8
9	1 44	1 38	1 35	1 33	1 34	1 35	1 37	1 42	1 50	1 58	2 7	2 17	2 26	2 35	2 44	2 54	9
10	1 50	1 42	1 37	1 34	1 33	1 34	1 35	1 38	1 44	1 50	1 58	2 6	2 14	2 22	2 30	2 39	10
11	1 56	1 46	1 40	1 36	1 34	1 33	1 34	1 36	1 40	1 45	1 51	1 58	2 5	2 12	2 20	2 27	11
12	2 2	1 51	1 44	1 39	1 36	1 34	1 33	1 35	1 37	1 41	1 46	1 52	1 58	2 4	2 11	2 17	12
13	2 9	1 56	1 48	1 42	1 39	1 36	1 34	1 34	1 35	1 38	1 42	1 47	1 52	1 58	2 4	2 9	13
14	2 16	2 2	1 53	1 46	1 42	1 39	1 36	1 33	1 34	1 36	1 39	1 43	1 47	1 52	1 57	2 2	14
15	2 23	2 8	1 58	1 50	1 45	1 41	1 38	1 34	1 33	1 34	1 36	1 39	1 43	1 47	1 51	1 56	15
16	2 30	2 14	2 3	1 54	1 48	1 43	1 40	1 35	1 33	1 33	1 34	1 36	1 39	1 43	1 47	1 52	16
17	2 37	2 20	2 8	1 58	1 51	1 46	1 42	1 36	1 34	1 33	1 34	1 35	1 37	1 40	1 44	1 48	17
18	2 45	2 27	2 13	2 2	1 54	1 48	1 44	1 37	1 34	1 33	1 33	1 34	1 36	1 38	1 41	1 44	18
19	2 53	2 33	2 18	2 7	1 58	1 51	1 46	1 39	1 35	1 33	1 33	1 34	1 35	1 37	1 39	1 41	19
20	3 1	2 40	2 24	2 11	2 2	1 54	1 49	1 41	1 36	1 34	1 33	1 33	1 34	1 35	1 37	1 39	20
21	3 9	2 46	2 29	2 16	2 6	1 58	1 52	1 43	1 37	1 34	1 33	1 33	1 33	1 34	1 35	1 37	21
22	3 17	2 53	2 35	2 20	2 10	2 2	1 55	1 45	1 39	1 35	1 33	1 32	1 33	1 33	1 34	1 35	22
23	3 25	2 59	2 40	2 25	2 14	2 5	1 58	1 47	1 40	1 36	1 34	1 32	1 32	1 33	1 33	1 34	23
24	3 33	3 6	2 46	2 30	2 18	2 8	2 1	1 50	1 42	1 37	1 34	1 32	1 32	1 32	1 33	1 34	24
25	3 41	3 12	2 51	2 35	2 23	2 12	2 4	1 52	1 44	1 38	1 35	1 33	1 32	1 32	1 32	1 33	25
26	3 48	3 18	2 57	2 40	2 27	2 16	2 8	1 55	1 46	1 40	1 36	1 33	1 32	1 31	1 31	1 32	26
27	3 56	3 25	3 2	2 45	2 31	2 20	2 12	1 57	1 48	1 41	1 37	1 34	1 32	1 31	1 31	1 31	27
28	4 3	3 31	3 7	2 49	2 35	2 24	2 15	2 0	1 50	1 43	1 38	1 34	1 32	1 31	1 30	1 31	28
29	4 11	3 37	3 13	2 54	2 39	2 27	2 18	2 2	1 52	1 45	1 39	1 35	1 33	1 32	1 31	1 30	29
30	4 18	3 44	3 19	2 59	2 43	2 31	2 21	2 5	1 54	1 46	1 40	1 36	1 34	1 32	1 31	1 30	30
31	4 26	3 50	3 24	3 4	2 47	2 34	2 24	2 8	1 56	1 48	1 41	1 37	1 34	1 32	1 31	1 30	31
32	4 33	3 56	3 29	3 9	2 51	2 38	2 27	2 11	1 58	1 50	1 43	1 38	1 35	1 33	1 32	1 31	32
33	4 40	4 2	3 35	3 14	2 56	2 42	2 30	2 14	2 0	1 51	1 44	1 39	1 35	1 33	1 32	1 31	33
34	4 47	4 9	3 41	3 18	3 0	2 45	2 33	2 16	2 2	1 53	1 46	1 40	1 36	1 34	1 32	1 31	34
35	4 54	4 15	3 46	3 23	3 4	2 49	2 37	2 18	2 4	1 54	1 47	1 41	1 37	1 34	1 32	1 31	35
36	5 1	4 21	3 51	3 27	3 8	2 53	2 40	2 20	2 7	1 56	1 48	1 42	1 38	1 35	1 33	1 32	36
37	5 9	4 27	3 56	3 32	3 12	2 57	2 43	2 23	2 9	1 58	1 50	1 44	1 39	1 36	1 33	1 32	37
38	5 16	4 33	4 1	3 37	3 16	3 0	2 47	2 26	2 11	2 0	1 52	1 45	1 40	1 37	1 34	1 32	38
39	5 23	4 39	4 6	3 41	3 20	3 4	2 50	2 28	2 13	2 2	1 53	1 46	1 41	1 38	1 34	1 32	39
40	5 30	4 45	4 11	3 46	3 24	3 7	2 54	2 30	2 15	2 4	1 54	1 48	1 43	1 39	1 35	1 33	40
41	5 37	4 51	4 16	3 50	3 28	3 11	2 57	2 32	2 18	2 6	1 56	1 49	1 44	1 40	1 36	1 33	41
42	5 44	4 57	4 21	3 54	3 32	3 15	3 0	2 35	2 20	2 8	1 58	1 50	1 45	1 41	1 37	1 34	42
43	5 51	5 2	4 26	3 59	3 36	3 18	3 3	2 37	2 22	2 10	1 59	1 51	1 46	1 42	1 38	1 34	43
44	5 57	5 7	4 30	4 3	3 40	3 22	3 6	2 41	2 24	2 12	2 1	1 53	1 47	1 43	1 39	1 35	44
46	6 9	5 17	4 39	4 11	3 47	3 29	3 12	2 45	2 28	2 15	2 4	1 55	1 49	1 44	1 40	1 36	46
48	6 21	5 27	4 48	4 19	3 54	3 35	3 18	2 50	2 32	2 18	2 7	1 58	1 51	1 45	1 41	1 38	48
50	6 32	5 37	4 57	4 26	4 1	3 41	3 23	2 55	2 35	2 21	2 10	2 0	1 53	1 47	1 43	1 39	50
52	6 43	5 46	5 6	4 33	4 7	3 46	3 28	2 59	2 39	2 24	2 12	2 2	1 55	1 49	1 44	1 40	52
54	6 54	5 55	5 14	4 40	4 13	3 52	3 33	3 3	2 43	2 27	2 15	2 5	1 57	1 50	1 45	1 41	54
56	7 4	6 4	5 22	4 47	4 19	3 57	3 38	3 7	2 47	2 31	2 18	2 7	1 59	1 52	1 46	1 42	56
58	7 13	6 12	5 29	4 53	4 25	4 2	3 43	3 11	2 50	2 34	2 21	2 9	2 0	1 53	1 47	1 43	58
60	7 22	6 20	5 35	4 58	4 30	4 7	3 47	3 15	2 53	2 37	2 23	2 11	2 2	1 54	1 49	1 44	60
62	7 31	6 27	5 41	5 3	4 35	4 11	3 51	3 19	2 56	2 39	2 25	2 13	2 4	1 56	1 50	1 45	62
64	7 39	6 33	5 47	5 8	4 40	4 15	3 55	3 22	2 59	2 41	2 27	2 15	2 5	1 57	1 51	1 46	64
66	7 46	6 39	5 53	5 13	4 44	4 19	3 59	3 25	3 1	2 43	2 29	2 16	2 6	1 58	1 52	1 47	66
68	7 52	6 45	5 58	5 18	4 48	4 23	4 2	3 28	3 3	2 45	2 30	2 18	2 7	1 59	1 52	1 47	68
70	7 58	6 50	6 3	5 22	4 52	4 26	4 4	3 30	3 5	2 47	2 31	2 19	2 8	2 0	1 53	1 48	70
72	8 4	6 55	6 7	5 26	4 55	4 29	4 7	3 32	3 7	2 48	2 33	2 20	2 9	2 1	1 54	1 48	72
74	8 9	7 0	6 10	5 30	4 58	4 31	4 9	3 34	3 9	2 49	2 34	2 21	2 10	2 2	1 55	1 49	74
76	8 13	7 4	6 14	5 33	5 1	4 33	4 11	3 35	3 11	2 50	2 35	2 22	2 11	2 2	1 56	1 49	76
78	8 16	7 7	6 17	5 36	5 3	4 35	4 12	3 37	3 12	2 51	2 36	2 23	2 12	2 3	1 56	1 50	78
80	8 19	7 10	6 19	5 38	5 5	4 37	4 14	3 38	3 13	2 52	2 37	2 24	2 13	2 4	1 57	1 51	80
82			6 21	5 40	5 7	4 39	4 16	3 39	3 13	2 53	2 38	2 24	2 13	2 4	1 57		82
84					5 9	4 41	4 17	3 40	3 14	2 54	2 38	2 24	2 14	2 5			84
86							4 18	3 41	3 15	2 54	2 38	2 24	2 14				86
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	

THIRD CORRECTION, to APPARENT DISTANCE 72°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																					☽'s App Alt.
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°						
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″						°
6	4 27	4 41	4 56	5 11	5 38	6 3	6 27	6 48	7 8	7 27	7 42	7 55	8 6	8 16								6
7	3 51	4 3	4 16	4 28	4 51	5 12	5 32	5 51	6 8	6 23	6 36	6 48	6 58	7 7								7
8	3 25	3 36	3 47	3 58	4 18	4 36	4 54	5 11	5 26	5 39	5 51	6 1	6 9	6 16	6 22							8
9	3 4	3 14	3 24	3 33	3 51	4 8	4 23	4 37	4 50	5 1	5 11	5 20	5 28	5 35	5 41							9
10	2 48	2 57	3 6	3 14	3 29	3 44	3 58	4 10	4 22	4 33	4 42	4 50	4 57	5 3	5 7							10
11	2 35	2 43	2 51	2 58	3 11	3 25	3 37	3 48	3 59	4 9	4 17	4 24	4 30	4 35	4 39							11
12	2 24	2 31	2 38	2 45	2 57	3 9	3 20	3 31	3 41	3 49	3 57	4 3	4 8	4 12	4 16	4 20						12
13	2 15	2 21	2 27	2 33	2 45	2 56	3 6	3 16	3 24	3 32	3 39	3 45	3 49	3 53	3 56	3 59						13
14	2 7	2 13	2 18	2 24	2 34	2 44	2 54	3 2	3 10	3 18	3 24	3 29	3 33	3 36	3 39	3 41						14
15	2 1	2 6	2 11	2 16	2 25	2 34	2 43	2 51	2 58	3 5	3 11	3 16	3 20	3 23	3 25	3 27						15
16	1 56	2 1	2 5	2 9	2 18	2 26	2 33	2 41	2 48	2 54	2 59	3 4	3 8	3 11	3 13	3 15						16
17	1 52	1 56	1 59	2 3	2 11	2 19	2 25	2 32	2 39	2 45	2 50	2 54	2 57	3 0	3 2	3 4						17
18	1 48	1 51	1 54	1 58	2 6	2 13	2 19	2 25	2 31	2 37	2 42	2 46	2 48	2 50	2 52	2 54						18
19	1 44	1 47	1 50	1 54	2 1	2 7	2 13	2 19	2 25	2 30	2 35	2 38	2 40	2 42	2 44	2 45						19
20	1 41	1 44	1 47	1 50	1 56	2 2	2 7	2 13	2 19	2 23	2 28	2 31	2 33	2 35	2 36	2 37						20
21	1 39	1 41	1 44	1 46	1 52	1 57	2 2	2 8	2 13	2 17	2 21	2 24	2 26	2 28	2 29	2 30						21
22	1 37	1 39	1 41	1 43	1 48	1 53	1 58	2 3	2 7	2 11	2 15	2 18	2 20	2 22	2 23	2 24						22
23	1 36	1 37	1 39	1 41	1 45	1 50	1 54	1 59	2 2	2 6	2 10	2 13	2 15	2 16	2 17	2 18						23
24	1 35	1 36	1 37	1 39	1 43	1 47	1 51	1 55	1 58	2 2	2 5	2 8	2 10	2 11	2 12	2 13						24
25	1 34	1 35	1 36	1 38	1 41	1 44	1 48	1 51	1 54	1 58	2 1	2 3	2 5	2 6	2 8							25
26	1 33	1 34	1 35	1 36	1 39	1 42	1 45	1 48	1 51	1 54	1 57	1 59	2 1	2 2	2 4							26
27	1 32	1 33	1 34	1 35	1 37	1 40	1 43	1 45	1 48	1 51	1 54	1 56	1 57	1 58	2 0							27
28	1 32	1 32	1 33	1 34	1 35	1 38	1 41	1 43	1 46	1 48	1 51	1 53	1 54	1 55	1 56							28
29	1 31	1 32	1 32	1 33	1 34	1 36	1 39	1 41	1 44	1 46	1 48	1 50	1 52	1 53								29
30	1 31	1 31	1 32	1 32	1 33	1 35	1 37	1 39	1 42	1 44	1 46	1 47	1 49	1 50								30
31	1 30	1 31	1 31	1 31	1 32	1 34	1 36	1 38	1 40	1 42	1 44	1 45	1 46	1 47								31
32	1 29	1 30	1 30	1 30	1 31	1 33	1 35	1 36	1 38	1 40	1 42	1 43	1 44	1 45								32
33	1 29	1 29	1 29	1 30	1 31	1 32	1 33	1 34	1 36	1 38	1 40	1 41	1 42									33
34	1 30	1 29	1 29	1 29	1 30	1 31	1 32	1 33	1 34	1 36	1 38	1 39	1 40									34
35	1 30	1 29	1 29	1 29	1 30	1 30	1 31	1 32	1 33	1 35	1 36	1 37	1 38									35
36	1 31	1 29	1 28	1 28	1 29	1 30	1 31	1 32	1 33	1 34	1 35	1 36	1 36									36
37	1 31	1 30	1 28	1 28	1 29	1 29	1 30	1 31	1 32	1 33	1 34	1 35										37
38	1 31	1 30	1 28	1 27	1 28	1 29	1 30	1 31	1 32	1 33	1 33	1 34										38
39	1 31	1 30	1 29	1 28	1 28	1 28	1 29	1 30	1 31	1 32	1 32	1 32										39
40	1 31	1 30	1 29	1 28	1 27	1 28	1 28	1 29	1 30	1 30	1 30	1 30										40
41	1 31	1 30	1 29	1 28	1 27	1 27	1 27	1 28	1 28	1 29	1 29											41
42	1 32	1 31	1 29	1 28	1 26	1 26	1 26	1 27	1 27	1 28	1 28											42
43	1 32	1 31	1 29	1 28	1 26	1 26	1 26	1 26	1 26	1 27	1 27											43
44	1 33	1 31	1 30	1 28	1 26	1 26	1 25	1 25	1 25	1 26	1 26											44
46	1 34	1 32	1 30	1 29	1 27	1 25	1 25	1 25	1 25	1 25												46
48	1 35	1 32	1 30	1 29	1 27	1 25	1 24	1 24	1 24	1 24												48
50	1 36	1 33	1 31	1 30	1 27	1 25	1 24	1 23	1 23													50
52	1 37	1 34	1 31	1 30	1 27	1 25	1 23	1 22	1 23													52
54	1 37	1 34	1 32	1 31	1 28	1 25	1 23	1 22														54
56	1 38	1 35	1 33	1 31	1 28	1 25	1 23	1 22														56
58	1 39	1 36	1 34	1 32	1 28	1 25	1 23															58
60	1 39	1 36	1 34	1 32	1 28	1 25	1 23															60
62	1 40	1 37	1 35	1 32	1 28	1 25																62
64	1 41	1 38	1 36	1 33	1 28	1 25																64
66	1 42	1 38	1 36	1 33	1 28																	66
68	1 43	1 39	1 36	1 34	1 29																	68
70	1 43	1 39	1 36	1 34																		70
72	1 44	1 40	1 36	1 34																		72
74	1 44	1 40	1 36																			74
76	1 45	1 40																				76
78	1 45																					78
80																						80
82																						82
84																						84
86																						86
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°											

TABLE P. EFFECT OF SUN'S PAR.

Add the Numbers above the lines to 3rd Correction, subtract the others.

☽'s App Alt.	Sun's Apparent Altitude.								
	5	10	20	30	40	50	60	70	80	90
	″	″	″	″	″	″	″	″	″	″
5	1	0	0	1	1	2	2	2		
10	2	1	1	0	0	1	1	1	1	
20	3	3	2	2	1	1	1	1	0	0
30	4	4	4	3	3	2	2	2	2	
40	6	6	5	5	4	4	4	3		
50	7	7	6	6	5	5	5			
60	8	8	7	7	6	6				
70	9	8	8	7	7					
80		9	8	8						
90			9							

TABLE XVIII.

Third Correction, to Apparent Distance 76°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																☽'s App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	1 37	1 39	1 41	1 44	1 48	1 54	2 0	2 13	2 27	2 42	2 57	3 13	3 28	3 43	3 58	4 13	6
7	1 40	1 37	1 38	1 40	1 43	1 47	1 51	2 1	2 12	2 24	2 37	2 50	3 3	3 15	3 28	3 40	7
8	1 44	1 40	1 37	1 38	1 40	1 42	1 45	1 52	2 2	2 12	2 22	2 33	2 44	2 54	3 5	3 16	8
9	1 49	1 43	1 39	1 37	1 38	1 39	1 41	1 46	1 54	2 2	2 11	2 20	2 30	2 39	2 48	2 58	9
10	1 54	1 46	1 41	1 39	1 37	1 38	1 39	1 42	1 48	1 55	2 2	2 10	2 18	2 26	2 34	2 43	10
11	2 0	1 50	1 44	1 41	1 39	1 37	1 38	1 40	1 44	1 49	1 55	2 2	2 9	2 16	2 23	2 31	11
12	2 6	1 55	1 48	1 44	1 41	1 38	1 37	1 38	1 41	1 45	1 50	1 56	2 2	2 8	2 15	2 21	12
13	2 12	2 0	1 52	1 47	1 43	1 40	1 38	1 37	1 39	1 42	1 46	1 51	1 56	2 2	2 8	2 13	13
14	2 19	2 6	1 56	1 50	1 45	1 42	1 40	1 37	1 38	1 40	1 43	1 47	1 52	1 57	2 2	2 7	14
15	2 26	2 12	2 1	1 54	1 48	1 44	1 42	1 38	1 37	1 39	1 41	1 45	1 49	1 53	1 57	2 1	15
16	2 34	2 18	2 6	1 58	1 51	1 47	1 44	1 39	1 37	1 38	1 40	1 43	1 46	1 49	1 53	1 56	16
17	2 41	2 24	2 11	2 2	1 54	1 49	1 46	1 40	1 38	1 37	1 39	1 41	1 43	1 46	1 49	1 52	17
18	2 49	2 30	2 17	2 6	1 58	1 52	1 48	1 42	1 39	1 36	1 38	1 39	1 41	1 43	1 46	1 49	18
19	2 57	2 36	2 22	2 10	2 2	1 55	1 50	1 43	1 40	1 37	1 37	1 38	1 39	1 41	1 43	1 46	19
20	3 5	2 43	2 27	2 15	2 6	1 58	1 52	1 45	1 41	1 38	1 36	1 37	1 38	1 39	1 41	1 43	20
21	3 12	2 49	2 33	2 20	2 10	2 2	1 55	1 47	1 42	1 39	1 37	1 36	1 37	1 38	1 39	1 41	21
22	3 20	2 56	2 38	2 24	2 14	2 5	1 58	1 49	1 44	1 40	1 38	1 36	1 36	1 37	1 38	1 39	22
23	3 28	3 3	2 44	2 29	2 18	2 9	2 1	1 51	1 45	1 41	1 38	1 36	1 35	1 36	1 37	1 38	23
24	3 36	3 9	2 49	2 34	2 22	2 12	2 4	1 54	1 47	1 42	1 39	1 37	1 35	1 36	1 36	1 37	24
25	3 44	3 15	2 54	2 39	2 26	2 16	2 7	1 56	1 49	1 44	1 40	1 37	1 36	1 36	1 36	1 37	25
26	3 51	3 21	3 0	2 44	2 30	2 20	2 11	1 59	1 51	1 45	1 41	1 38	1 36	1 35	1 35	1 36	26
27	3 59	3 28	3 5	2 49	2 34	2 23	2 14	2 2	1 53	1 47	1 42	1 39	1 37	1 36	1 35	1 35	27
28	4 6	3 34	3 10	2 54	2 38	2 27	2 17	2 4	1 54	1 48	1 43	1 39	1 37	1 36	1 35	1 35	28
29	4 13	3 40	3 15	2 58	2 42	2 31	2 21	2 7	1 56	1 49	1 44	1 40	1 38	1 36	1 35	1 34	29
30	4 20	3 46	3 21	3 3	2 47	2 34	2 24	2 9	1 58	1 51	1 45	1 41	1 39	1 37	1 35	1 34	30
31	4 27	3 52	3 26	3 7	2 51	2 38	2 28	2 12	2 0	1 52	1 46	1 42	1 39	1 37	1 35	1 34	31
32	4 34	3 58	3 31	3 12	2 55	2 42	2 31	2 14	2 2	1 54	1 48	1 43	1 40	1 38	1 36	1 35	32
33	4 41	4 4	3 37	3 16	2 59	2 45	2 34	2 17	2 4	1 55	1 49	1 44	1 41	1 38	1 36	1 35	33
34	4 48	4 10	3 42	3 20	3 3	2 49	2 37	2 19	2 6	1 57	1 50	1 45	1 42	1 39	1 37	1 35	34
35	4 55	4 16	3 47	3 25	3 7	2 52	2 41	2 22	2 8	1 59	1 52	1 46	1 42	1 39	1 37	1 35	35
36	5 2	4 22	3 53	3 29	3 11	2 56	2 44	2 24	2 11	2 1	1 53	1 47	1 43	1 40	1 38	1 36	36
37	5 9	4 27	3 58	3 34	3 15	3 0	2 47	2 27	2 13	2 3	1 55	1 48	1 44	1 41	1 38	1 36	37
38	5 16	4 33	4 3	3 38	3 19	3 3	2 50	2 29	2 15	2 4	1 56	1 49	1 45	1 42	1 39	1 37	38
39	5 23	4 38	4 8	3 43	3 23	3 7	2 53	2 31	2 17	2 6	1 58	1 51	1 46	1 42	1 39	1 37	39
40	5 30	4 44	4 13	3 47	3 27	3 10	2 56	2 34	2 19	2 8	1 59	1 52	1 47	1 43	1 40	1 38	40
41	5 37	4 50	4 18	3 51	3 31	3 14	2 59	2 36	2 22	2 10	2 0	1 53	1 48	1 44	1 41	1 38	41
42	5 43	4 55	4 23	3 55	3 34	3 17	3 2	2 39	2 24	2 12	2 1	1 54	1 49	1 45	1 42	1 39	42
43	5 49	5 1	4 28	3 59	3 38	3 20	3 5	2 41	2 26	2 14	2 3	1 56	1 50	1 46	1 43	1 40	43
44	5 55	5 6	4 33	4 3	3 41	3 24	3 8	2 44	2 28	2 15	2 4	1 57	1 51	1 47	1 43	1 40	44
46	6 7	5 16	4 42	4 11	3 49	3 31	3 14	2 49	2 32	2 18	2 7	1 59	1 53	1 48	1 44	1 41	46
48	6 19	5 26	4 51	4 19	3 56	3 37	3 20	2 54	2 35	2 21	2 10	2 2	1 55	1 50	1 46	1 43	48
50	6 30	5 36	4 59	4 27	4 3	3 43	3 25	2 58	2 39	2 25	2 13	2 4	1 57	1 51	1 47	1 44	50
52	6 41	5 46	5 7	4 34	4 10	3 49	3 30	3 3	2 43	2 28	2 16	2 6	1 59	1 53	1 49	1 45	52
54	6 51	5 55	5 15	4 41	4 17	3 55	3 35	3 7	2 47	2 31	2 19	2 9	2 1	1 55	1 50	1 46	54
56	7 1	6 4	5 22	4 48	4 23	4 0	3 40	3 11	2 50	2 34	2 22	2 12	2 3	1 56	1 51	1 47	56
58	7 11	6 12	5 29	4 54	4 28	4 5	3 45	3 15	2 53	2 37	2 25	2 14	2 5	1 57	1 52	1 48	58
60	7 20	6 20	5 36	5 0	4 33	4 9	3 49	3 19	2 56	2 40	2 27	2 16	2 6	1 59	1 53	1 49	60
62	7 28	6 27	5 42	5 5	4 37	4 14	3 53	3 22	2 59	2 43	2 29	2 18	2 8	2 0	1 54	1 50	62
64	7 36	6 34	5 48	5 10	4 41	4 18	3 57	3 25	3 2	2 45	2 31	2 20	2 10	2 2	1 56	1 51	64
66	7 43	6 40	5 54	5 15	4 45	4 22	4 1	3 28	3 5	2 47	2 33	2 21	2 11	2 3	1 57	1 52	66
68	7 49	6 45	5 59	5 19	4 49	4 26	4 5	3 31	3 8	2 49	2 35	2 23	2 13	2 4	1 58	1 53	68
70	7 55	6 50	6 3	5 23	4 53	4 29	4 8	3 34	3 10	2 51	2 36	2 24	2 14	2 5	1 58	1 53	70
72	8 1	6 54	6 7	5 27	4 57	4 32	4 11	3 37	3 12	2 52	2 37	2 25	2 15	2 6	1 59	1 54	72
74	8 6	6 58	6 10	5 30	5 0	4 34	4 13	3 39	3 13	2 53	2 38	2 26	2 16	2 7	2 0	1 54	74
76	8 11	7 2	6 13	5 33	5 3	4 36	4 15	3 41	3 14	2 54	2 39	2 26	2 16	2 7	2 1	1 55	76
78	8 15	7 6	6 16	5 36	5 5	4 38	4 17	3 42	3 15	2 55	2 40	2 27	2 17	2 8	2 1		78
80	8 18	7 9	6 19	5 38	5 7	4 40	4 19	3 43	3 16	2 56	2 40	2 28	2 18	2 9			80
82	8 20	7 11	6 21	5 40	5 9	4 42	4 20	3 44	3 17	2 57	2 41	2 28	2 18				82
84	8 22	7 13	6 23	5 42	5 10	4 43	4 21	3 45	3 18	2 58	2 41	2 28					84
86			6 25	5 44	5 11	4 44	4 22	3 45	3 18	2 58	2 42						86
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	

TABLE XVIII.

Third Correction, to Apparent Distance 76°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																		☽'s App Alt.
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°			
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″			°
6	4 28	4 42	4 57	5 11	5 37	6 2	6 26	6 47	7 6	7 24	7 40	7 54	8 5	8 13	8 20				6
7	3 53	4 5	4 17	4 29	4 52	5 13	5 33	5 52	6 9	6 24	6 37	6 48	6 57	7 5	7 12				7
8	3 27	3 38	3 49	3 59	4 19	4 38	4 56	5 12	5 26	5 38	5 51	6 1	6 9	6 16	6 21	6 26			8
9	3 8	3 17	3 26	3 35	3 52	4 8	4 24	4 38	4 51	5 3	5 13	5 22	5 29	5 35	5 40	5 44			9
10	2 52	3 0	3 8	3 16	3 31	3 46	4 1	4 14	4 25	4 35	4 44	4 52	4 59	5 4	5 8	5 11			10
11	2 39	2 46	2 53	3 0	3 14	3 27	3 40	3 51	4 2	4 12	4 20	4 27	4 33	4 38	4 42	4 45			11
12	2 28	2 34	2 41	2 47	3 0	3 12	3 23	3 34	3 43	3 52	4 0	4 6	4 11	4 15	4 19	4 22			12
13	2 19	2 25	2 30	2 36	2 48	2 59	3 9	3 19	3 28	3 36	3 43	3 48	3 53	3 57	4 0	4 2			13
14	2 12	2 17	2 22	2 27	2 38	2 48	2 58	3 6	3 14	3 22	3 28	3 33	3 37	3 41	3 43	3 45			14
15	2 5	2 10	2 15	2 19	2 29	2 38	2 47	2 55	3 3	3 9	3 15	3 20	3 24	3 27	3 29	3 31			15
16	2 0	2 4	2 9	2 13	2 21	2 29	2 37	2 45	2 52	2 58	3 4	3 8	3 12	3 15	3 17	3 19			16
17	1 56	1 59	2 3	2 7	2 14	2 22	2 29	2 36	2 43	2 49	2 54	2 58	3 2	3 4	3 6	3 8			17
18	1 52	1 55	1 58	2 2	2 9	2 16	2 23	2 30	2 36	2 42	2 46	2 50	2 53	2 55	2 57	2 58			18
19	1 49	1 51	1 54	1 58	2 4	2 11	2 17	2 24	2 30	2 35	2 39	2 42	2 45	2 47	2 49	2 50			19
20	1 46	1 48	1 51	1 54	2 0	2 6	2 12	2 18	2 24	2 28	2 32	2 35	2 37	2 39	2 41	2 42			20
21	1 43	1 45	1 48	1 51	1 56	2 2	2 7	2 13	2 18	2 22	2 26	2 29	2 31	2 33	2 34				21
22	1 41	1 43	1 46	1 48	1 53	1 58	2 3	2 8	2 13	2 17	2 20	2 23	2 25	2 27	2 28				22
23	1 40	1 42	1 44	1 46	1 50	1 55	1 59	2 3	2 8	2 12	2 15	2 17	2 19	2 21	2 23				23
24	1 39	1 40	1 42	1 44	1 48	1 52	1 56	1 59	2 4	2 7	2 10	2 12	2 14	2 16	2 18				24
25	1 38	1 39	1 40	1 42	1 46	1 49	1 53	1 56	2 0	2 3	2 6	2 8	2 10	2 12					25
26	1 37	1 38	1 39	1 41	1 44	1 47	1 50	1 53	1 56	1 59	2 2	2 4	2 6	2 8					26
27	1 36	1 37	1 38	1 40	1 42	1 45	1 48	1 50	1 53	1 56	1 59	2 1	2 3	2 5					27
28	1 36	1 37	1 38	1 39	1 41	1 43	1 46	1 48	1 50	1 53	1 56	1 58	2 0	2 2					28
29	1 35	1 36	1 37	1 38	1 40	1 42	1 44	1 46	1 48	1 50	1 53	1 55	1 57						29
30	1 35	1 35	1 36	1 37	1 38	1 40	1 42	1 44	1 46	1 48	1 50	1 52	1 54						30
31	1 34	1 34	1 35	1 36	1 37	1 39	1 40	1 42	1 44	1 46	1 48	1 50	1 52						31
32	1 34	1 34	1 34	1 35	1 36	1 38	1 39	1 41	1 43	1 44	1 46	1 48	1 50						32
33	1 34	1 33	1 34	1 35	1 35	1 37	1 38	1 40	1 42	1 43	1 45	1 46							33
34	1 34	1 33	1 33	1 34	1 35	1 36	1 37	1 39	1 41	1 42	1 44	1 45							34
35	1 34	1 33	1 33	1 33	1 34	1 35	1 36	1 38	1 39	1 40	1 42	1 43							35
36	1 35	1 34	1 33	1 33	1 33	1 34	1 35	1 37	1 38	1 39	1 40	1 41							36
37	1 35	1 34	1 33	1 32	1 33	1 33	1 34	1 36	1 37	1 38	1 39								37
38	1 35	1 34	1 33	1 32	1 32	1 33	1 34	1 35	1 36	1 37	1 38								38
39	1 36	1 34	1 33	1 32	1 32	1 33	1 33	1 34	1 35	1 36	1 36								39
40	1 36	1 35	1 34	1 33	1 32	1 32	1 33	1 34	1 34	1 35	1 35								40
41	1 37	1 35	1 34	1 33	1 32	1 32	1 32	1 33	1 33	1 34									41
42	1 37	1 35	1 34	1 33	1 31	1 31	1 32	1 32	1 33	1 33									42
43	1 37	1 35	1 34	1 33	1 31	1 30	1 31	1 31	1 32	1 32									43
44	1 38	1 36	1 34	1 33	1 31	1 30	1 30	1 31	1 31	1 31									44
46	1 39	1 37	1 35	1 34	1 31	1 29	1 29	1 30	1 30										46
48	1 40	1 38	1 36	1 34	1 31	1 29	1 29	1 29	1 29										48
50	1 41	1 38	1 37	1 35	1 32	1 30	1 29	1 29											50
52	1 42	1 39	1 37	1 35	1 32	1 30	1 29	1 28											52
54	1 43	1 40	1 38	1 36	1 33	1 30	1 29												54
56	1 44	1 41	1 38	1 36	1 33	1 30	1 29												56
58	1 45	1 42	1 39	1 37	1 33	1 30													58
60	1 46	1 43	1 40	1 37	1 33	1 30													60
62	1 46	1 43	1 40	1 37	1 33														62
64	1 47	1 44	1 41	1 38	1 33														64
66	1 48	1 44	1 41	1 38															66
68	1 49	1 45	1 41	1 38															68
70	1 49	1 45	1 41																70
72	1 49	1 45																	72
74	1 50																		74
76																			76
78																			78
80																			80
82																			82
84																			84
86																			86
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°								

TABLE P. EFFECT OF SUN'S PAR.

Add the Numbers above the lines to 3rd Correction, subtract the others.

☽'s App Alt.	Sun's Apparent Altitude.								
	5	10	20	30	40	50	60	70	80	90
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
5	1	1	0	0	1	1	1	1	1	
10	1	1	1	0	0	0	0	0	1	
15	2	2	1	1	1	0	0	0	1	0
20	3	3	2	2	1	1	1	1	1	
25	4	4	3	3	2	2	2	2	2	
30	4	4	4	3	3	2	3	3	3	
35	5	5	4	4	4	3	4	3	3	
40	6	6	5	5	4	4	4	4		
45	6	6	6	5	5	5	5	5		
50	7	7	6	6	6	5	5			
55	7	7	7	6	6	6	6			
60	8	8	7	7	7	7				
65	8	8	8	7	7					
70	9	9	8	8	8					
75	9	9	9	8						
80	9	9	9	9						

TABLE XVIII

Third Correction, to Apparent Distance 80°

D's App Alt	APPARENT ALTITUDE OF THE SUN, OR STAR.															D's App Alt
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	1 41	1 43	1 46	1 50	1 54	1 59	2 4	2 17	2 32	2 47	3 2	3 17	3 32	3 47	4 2	4 16	6
7	1 41	1 41	1 43	1 45	1 48	1 51	1 55	2 5	2 17	2 29	2 41	2 54	3 6	3 19	3 31	3 44	7
8	1 48	1 43	1 41	1 42	1 44	1 46	1 49	1 56	2 6	2 16	2 26	2 37	2 48	2 59	3 10	3 20	8
9	1 52	1 46	1 43	1 41	1 42	1 44	1 46	1 51	1 58	2 6	2 15	2 25	2 34	2 43	2 52	3 1	9
10	1 57	1 50	1 46	1 43	1 41	1 42	1 44	1 47	1 53	1 59	2 6	2 14	2 22	2 30	2 38	2 46	10
11	2 3	1 54	1 49	1 45	1 43	1 41	1 42	1 45	1 49	1 54	1 59	2 6	2 13	2 20	2 27	2 34	11
12	2 9	1 59	1 52	1 48	1 45	1 43	1 41	1 43	1 46	1 50	1 54	2 0	2 6	2 12	2 19	2 25	12
13	2 16	2 4	1 56	1 51	1 48	1 45	1 42	1 42	1 44	1 47	1 51	1 56	2 1	2 6	2 12	2 18	13
14	2 23	2 10	2 0	1 54	1 50	1 47	1 44	1 41	1 43	1 45	1 48	1 52	1 57	2 2	2 7	2 12	14
15	2 30	2 16	2 5	1 58	1 53	1 49	1 46	1 42	1 42	1 44	1 46	1 49	1 53	1 58	2 2	2 7	15
16	2 37	2 22	2 10	2 2	1 56	1 52	1 48	1 43	1 41	1 43	1 45	1 47	1 50	1 54	1 58	2 2	16
17	2 45	2 28	2 15	2 6	1 59	1 54	1 50	1 45	1 42	1 42	1 43	1 45	1 48	1 51	1 54	1 58	17
18	2 53	2 34	2 21	2 11	2 3	1 57	1 52	1 47	1 43	1 41	1 42	1 44	1 46	1 48	1 51	1 54	18
19	3 0	2 41	2 26	2 15	2 7	2 0	1 54	1 48	1 44	1 42	1 41	1 43	1 44	1 46	1 49	1 51	19
20	3 8	2 47	2 31	2 20	2 10	2 3	1 57	1 50	1 46	1 43	1 41	1 42	1 43	1 45	1 47	1 49	20
21	3 16	2 54	2 37	2 24	2 14	2 6	1 59	1 52	1 47	1 44	1 42	1 41	1 42	1 43	1 45	1 47	21
22	3 23	3 0	2 43	2 29	2 18	2 9	2 2	1 54	1 49	1 45	1 42	1 40	1 41	1 42	1 43	1 45	22
23	3 31	3 6	2 47	2 33	2 22	2 13	2 5	1 57	1 51	1 47	1 43	1 41	1 40	1 41	1 42	1 44	23
24	3 38	3 12	2 53	2 38	2 25	2 16	2 8	1 59	1 52	1 48	1 44	1 41	1 40	1 41	1 42	1 43	24
25	3 46	3 18	2 58	2 42	2 29	2 19	2 12	2 1	1 54	1 49	1 45	1 42	1 40	1 40	1 41	1 42	25
26	3 53	3 24	3 4	2 47	2 33	2 23	2 15	2 3	1 55	1 50	1 46	1 43	1 41	1 40	1 41	1 42	26
27	4 1	3 31	3 10	2 52	2 37	2 26	2 19	2 6	1 57	1 51	1 47	1 43	1 41	1 40	1 40	1 41	27
28	4 8	3 37	3 15	2 56	2 41	2 30	2 22	2 8	1 59	1 53	1 48	1 44	1 42	1 41	1 40	1 40	28
29	4 15	3 45	3 20	3 1	2 46	2 34	2 26	2 11	2 1	1 55	1 49	1 45	1 43	1 41	1 40	1 39	29
30	4 22	3 49	3 25	3 5	2 50	2 38	2 29	2 14	2 3	1 56	1 50	1 46	1 44	1 42	1 40	1 39	30
31	4 29	3 55	3 30	3 10	2 54	2 41	2 32	2 17	2 5	1 58	1 52	1 47	1 44	1 42	1 40	1 39	31
32	4 36	4 1	3 35	3 14	2 58	2 45	2 35	2 19	2 7	1 59	1 53	1 48	1 45	1 43	1 41	1 39	32
33	4 43	4 7	3 40	3 19	3 2	2 49	2 38	2 22	2 9	2 1	1 54	1 49	1 46	1 44	1 42	1 40	33
34	4 50	4 12	3 45	3 23	3 6	2 52	2 41	2 24	2 11	2 2	1 56	1 50	1 47	1 44	1 42	1 40	34
35	4 57	4 18	3 50	3 28	3 10	2 56	2 44	2 27	2 14	2 4	1 57	1 51	1 47	1 44	1 42	1 40	35
36	5 4	4 24	3 55	3 32	3 14	3 0	2 47	2 29	2 16	2 6	1 58	1 52	1 48	1 45	1 43	1 41	36
37	5 11	4 29	4 0	3 37	3 19	3 3	2 50	2 32	2 18	2 8	2 0	1 53	1 49	1 46	1 44	1 42	37
38	5 18	4 35	4 5	3 42	3 23	3 7	2 54	2 34	2 20	2 9	2 1	1 54	1 49	1 46	1 44	1 42	38
39	5 25	4 41	4 10	3 46	3 27	3 11	2 58	2 36	2 22	2 10	2 2	1 55	1 50	1 47	1 45	1 43	39
40	5 31	4 47	4 15	3 50	3 31	3 14	3 1	2 38	2 24	2 12	2 4	1 57	1 51	1 47	1 45	1 43	40
41	5 38	4 52	4 20	3 54	3 35	3 18	3 4	2 41	2 26	2 14	2 5	1 58	1 52	1 48	1 46	1 44	41
42	5 44	4 57	4 25	3 58	3 38	3 21	3 7	2 44	2 28	2 16	2 7	1 59	1 53	1 49	1 46	1 44	42
43	5 51	5 3	4 30	4 2	3 42	3 25	3 10	2 46	2 30	2 17	2 8	2 1	1 55	1 50	1 47	1 45	43
44	5 57	5 8	4 35	4 6	3 46	3 28	3 13	2 48	2 32	2 19	2 10	2 2	1 56	1 51	1 48	1 45	44
46	6 9	5 18	4 44	4 14	3 53	3 35	3 19	2 53	2 36	2 23	2 13	2 4	1 58	1 53	1 49	1 46	46
48	6 20	5 28	4 53	4 22	4 0	3 41	3 25	2 58	2 39	2 26	2 15	2 7	2 0	1 55	1 51	1 48	48
50	6 31	5 38	5 1	4 30	4 6	3 47	3 30	3 3	2 43	2 29	2 18	2 9	2 1	1 56	1 52	1 49	50
52	6 41	5 47	5 9	4 37	4 12	3 53	3 35	3 7	2 47	2 32	2 21	2 12	2 4	1 58	1 54	1 50	52
54	6 51	5 56	5 17	4 44	4 18	3 58	3 39	3 11	2 51	2 35	2 24	2 14	2 6	1 59	1 55	1 52	54
56	7 1	6 5	5 24	4 50	4 24	4 3	3 44	3 15	2 54	2 38	2 26	2 17	2 8	2 1	1 57	1 53	56
58	7 11	6 14	5 31	4 56	4 30	4 8	3 49	3 19	2 57	2 41	2 29	2 19	2 10	2 3	1 58	1 54	58
60	7 20	6 22	5 38	5 2	4 35	4 13	3 54	3 23	3 0	2 44	2 31	2 21	2 12	2 5	1 59	1 55	60
62	7 28	6 29	5 44	5 7	4 40	4 18	3 58	3 27	3 3	2 47	2 33	2 22	2 13	2 6	2 0	1 56	62
64	7 36	6 35	5 50	5 12	4 44	4 22	4 2	3 31	3 6	2 49	2 35	2 24	2 15	2 7	2 1	1 56	64
66	7 43	6 41	5 55	5 17	4 49	4 26	4 6	3 34	3 9	2 51	2 37	2 26	2 16	2 8	2 2	1 57	66
68	7 49	6 46	6 0	5 21	4 53	4 30	4 9	3 37	3 12	2 53	2 39	2 27	2 17	2 9	2 3	1 58	68
70	7 55	6 51	6 5	5 25	4 57	4 33	4 12	3 39	3 14	2 55	2 41	2 29	2 19	2 10	2 4	1 59	70
72	8 0	6 55	6 9	5 29	5 0	4 36	4 14	3 41	3 16	2 57	2 42	2 30	2 20	2 11	2 5	2 0	72
74	8 5	6 59	6 13	5 32	5 3	4 38	4 16	3 43	3 18	2 58	2 43	2 31	2 21	2 12	2 5		74
76	8 9	7 3	6 16	5 35	5 6	4 40	4 18	3 44	3 19	2 59	2 44	2 32	2 22	2 13			76
78	8 13	7 6	6 19	5 37	5 8	4 42	4 19	3 45	3 20	3 0	2 45	2 32	2 22				78
80	8 16	7 9	6 21	5 40	5 10	4 44	4 21	3 46	3 21	3 1	2 45	2 33					80
82	8 19	7 12	6 23	5 42	5 12	4 45	4 22	3 47	3 22	3 2	2 46						82
84	8 22	7 14	6 25	5 44	5 13	4 46	4 23	3 48	3 23	3 3							84
86	8 24	7 16	6 27	5 46	5 14	4 47	4 24	3 49	3 24								86
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	

TABLE XVIII.

THIRD CORRECTION, to APPARENT DISTANCE 80°.

D's App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																								D's App Alt.
	32°		34°		36°		38°		42°		46°		50°		54°		58°		62°		66°		70°		74°		78°		82°		86°		
°	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	°
6	4	30	4	44	4	58	5	12	5	39	6	4	6	28	6	49	7	8	7	26	7	41	7	54	8	5	8	13	8	19	8	24	6
7	3	56	4	8	4	19	4	30	4	52	5	14	5	35	5	54	6	11	6	26	6	39	6	50	6	59	7	6	7	12	7	16	7
8	3	31	3	41	3	52	4	2	4	23	4	42	4	59	5	15	5	29	5	42	5	54	6	4	6	12	6	18	6	23	6	27	8
9	3	11	3	21	3	30	3	39	3	56	4	12	4	28	4	42	4	54	5	5	5	15	5	24	5	32	5	38	5	43	5	46	9
10	2	54	3	3	3	12	3	20	3	35	3	50	4	4	4	16	4	28	4	39	4	48	4	56	5	2	5	7	5	11	5	14	10
11	2	42	2	49	2	57	3	5	3	19	3	32	3	44	3	56	4	7	4	16	4	24	4	31	4	36	4	41	4	45	4	47	11
12	2	32	2	38	2	45	2	52	3	5	3	17	3	28	3	38	3	48	3	57	4	5	4	11	4	15	4	19	4	22	4	25	12
13	2	24	2	30	2	36	2	42	2	53	3	4	3	14	3	23	3	32	3	40	3	47	3	53	3	57	4	1	4	4	4	6	13
14	2	18	2	23	2	28	2	33	2	43	2	53	3	2	3	11	3	19	3	26	3	32	3	38	3	42	3	46	3	48	3	49	14
15	2	12	2	16	2	21	2	25	2	34	2	43	2	52	3	0	3	7	3	13	3	19	3	25	3	29	3	32	3	34	3	36	15
16	2	6	2	10	2	14	2	18	2	26	2	34	2	42	2	50	2	56	3	2	3	8	3	13	3	17	3	20	3	22	3	24	16
17	2	1	2	4	2	8	2	12	2	20	2	27	2	34	2	41	2	47	2	53	2	58	3	3	3	6	3	9	3	11			17
18	1	57	2	0	2	3	2	7	2	14	2	21	2	28	2	34	2	40	2	46	2	50	2	54	2	57	3	0	3	2			18
19	1	54	1	56	1	59	2	2	2	9	2	16	2	22	2	28	2	34	2	39	2	43	2	47	2	50	2	52	2	53			19
20	1	51	1	53	1	56	1	58	2	5	2	11	2	17	2	22	2	28	2	33	2	37	2	40	2	43	2	45	2	46			20
21	1	49	1	51	1	53	1	55	2	1	2	7	2	12	2	17	2	22	2	27	2	31	2	34	2	37	2	38					21
22	1	47	1	49	1	51	1	53	1	58	2	3	2	8	2	13	2	17	2	21	2	25	2	28	2	31	2	32					22
23	1	46	1	47	1	49	1	51	1	55	2	0	2	4	2	9	2	13	2	17	2	20	2	23	2	26	2	27					23
24	1	45	1	46	1	47	1	49	1	53	1	57	2	1	2	5	2	9	2	13	2	16	2	19	2	21	2	22					24
25	1	44	1	45	1	46	1	48	1	51	1	54	1	58	2	1	2	5	2	9	2	12	2	14	2	16							25
26	1	43	1	44	1	45	1	46	1	49	1	52	1	55	1	58	2	2	2	5	2	8	2	10	2	12							26
27	1	42	1	43	1	44	1	45	1	47	1	50	1	53	1	56	1	59	2	2	2	5	2	7	2	8							27
28	1	41	1	42	1	43	1	44	1	46	1	48	1	51	1	54	1	57	1	59	2	2	2	4	2	5							28
29	1	40	1	41	1	41	1	42	1	44	1	46	1	49	1	52	1	55	1	57	1	59	2	1									29
30	1	39	1	40	1	40	1	41	1	43	1	45	1	48	1	51	1	53	1	55	1	57	1	59									30
31	1	39	1	40	1	40	1	41	1	42	1	44	1	46	1	49	1	51	1	53	1	55	1	57									31
32	1	39	1	39	1	39	1	40	1	41	1	43	1	45	1	47	1	49	1	51	1	53	1	55									32
33	1	39	1	39	1	39	1	40	1	41	1	42	1	44	1	46	1	48	1	49	1	51											33
34	1	39	1	39	1	39	1	40	1	41	1	42	1	43	1	45	1	47	1	48	1	49											34
35	1	39	1	39	1	39	1	39	1	40	1	41	1	42	1	44	1	45	1	46	1	47											35
36	1	40	1	39	1	39	1	39	1	40	1	41	1	42	1	43	1	44	1	45	1	46											36
37	1	41	1	40	1	39	1	38	1	39	1	40	1	41	1	42	1	43	1	44													37
38	1	41	1	40	1	39	1	38	1	39	1	40	1	41	1	42	1	42	1	43													38
39	1	41	1	40	1	39	1	38	1	39	1	39	1	40	1	41	1	41	1	42													39
40	1	41	1	40	1	39	1	38	1	38	1	38	1	39	1	40	1	40	1	41													40
41	1	42	1	41	1	40	1	39	1	38	1	38	1	38	1	39	1	39															41
42	1	42	1	41	1	40	1	39	1	37	1	37	1	37	1	38	1	38															42
43	1	43	1	41	1	40	1	39	1	37	1	37	1	37	1	37	1	38															43
44	1	43	1	42	1	40	1	39	1	37	1	37	1	36	1	37	1	37															44
46	1	44	1	42	1	41	1	40	1	38	1	37	1	36	1	36																	46
48	1	45	1	43	1	41	1	40	1	38	1	37	1	36	1	36																	48
50	1	46	1	44	1	42	1	41	1	38	1	36	1	36																			50
52	1	47	1	45	1	43	1	41	1	38	1	36	1	35																			52
54	1	48	1	46	1	44	1	42	1	38	1	36																					54
56	1	49	1	47	1	44	1	42	1	38	1	36																					56
58	1	50	1	47	1	45	1	42	1	38																							58
60	1	51	1	48	1	45	1	43	1	38																							60
62	1	52	1	49	1	46	1	43																									62
64	1	52	1	49	1	46	1	43																									64
66	1	53	1	49	1	46																											66
68	1	54	1	50																													68
70	1	55																															70
72																																	72
74																																	74
76																																	76
78																																	78
80																																	80
82																																	82
84																																	84
86																																	86
	32°		31°		36°		38°		42°		46°		50°		54°		58°		62°		66°												

TABLE P. EFFECT OF SUN's PAR.

Add the Numbers above the lines to 3rd Correction, subtract the others.

D's App Alt.	Sun's Apparent Altitude.									
	5 ″	10 ″	20 ″	30 ″	40 ″	50 ″	60 ″	70 ″	80 ″	90 ″
5	1	1	1	0	0	1	1	1	1	
10	1	1	1	1	1	0	1	1	0	
15	2	2	2	2	1	1	1	2	2	0
20	3	3	3	2	2	1	2	2	2	
25	4	4	3	3	2	2	2	3		
30	4	4	4	3	3	2	3	3		
35	5	5	4	4	3	3	3	4		
40	6	5	5	4	4	3	4	4		
45	6	6	5	5	4	4	4			
50	7	6	6	5	5	4	5			
55	7	7	6	6	5	5	5			
60	8	7	7	6	6	5	6			
65	8	8	7	7	6	6				
70	9	8	8	7	7	6				
75	9	9	8	8	7	7				
80	9	9	9	8	8	7				
90			9							

Third Correction to Apparent Distance 84°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.															☽'s App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	1 47	1 49	1 51	1 54	1 59	2 4	2 10	2 22	2 36	2 50	3 5	3 20	3 35	3 50	4 5	4 20	6
7	1 50	1 47	1 48	1 50	1 53	1 56	2 0	2 10	2 21	2 33	2 45	2 57	3 10	3 23	3 35	3 48	7
8	1 53	1 49	1 47	1 48	1 50	1 52	1 55	2 2	2 11	2 21	2 31	2 42	2 53	3 3	3 14	3 25	8
9	1 57	1 52	1 49	1 47	1 48	1 50	1 52	1 57	2 4	2 12	2 21	2 30	2 39	2 48	2 58	3 7	9
10	2 2	1 55	1 51	1 49	1 47	1 48	1 50	1 53	1 59	2 5	2 12	2 20	2 27	2 35	2 44	2 52	10
11	2 8	1 59	1 54	1 51	1 49	1 47	1 48	1 51	1 55	1 59	2 5	2 12	2 18	2 26	2 33	2 41	11
12	2 14	2 4	1 57	1 53	1 51	1 48	1 47	1 49	1 52	1 55	1 59	2 5	2 11	2 18	2 25	2 31	12
13	2 20	2 9	2 1	1 56	1 53	1 50	1 48	1 48	1 50	1 52	1 55	2 0	2 6	2 11	2 17	2 23	13
14	2 27	2 14	2 5	1 59	1 55	1 52	1 50	1 47	1 48	1 50	1 53	1 57	2 2	2 6	2 11	2 16	14
15	2 34	2 20	2 10	2 3	1 58	1 54	1 51	1 48	1 47	1 49	1 51	1 54	1 58	2 2	2 7	2 11	15
16	2 42	2 26	2 15	2 7	2 1	1 56	1 53	1 49	1 47	1 48	1 50	1 52	1 55	1 59	2 3	2 7	16
17	2 49	2 32	2 20	2 11	2 4	1 59	1 55	1 50	1 48	1 47	1 48	1 50	1 53	1 56	2 0	2 3	17
18	2 57	2 38	2 25	2 16	2 8	2 2	1 57	1 52	1 49	1 46	1 47	1 49	1 51	1 54	1 57	2 0	18
19	3 4	2 44	2 31	2 20	2 12	2 5	1 59	1 53	1 50	1 47	1 46	1 48	1 49	1 52	1 54	1 57	19
20	3 12	2 50	2 36	2 25	2 15	2 8	2 2	1 55	1 51	1 48	1 46	1 47	1 48	1 50	1 52	1 55	20
21	3 20	2 57	2 42	2 29	2 19	2 11	2 5	1 57	1 52	1 49	1 47	1 46	1 47	1 48	1 50	1 52	21
22	3 27	3 3	2 47	2 34	2 23	2 14	2 8	1 59	1 54	1 50	1 47	1 46	1 46	1 47	1 49	1 50	22
23	3 35	3 9	2 52	2 38	2 27	2 18	2 11	2 1	1 56	1 52	1 48	1 46	1 46	1 47	1 48	1 49	23
24	3 42	3 15	2 57	2 42	2 30	2 21	2 14	2 3	1 57	1 53	1 49	1 46	1 46	1 47	1 47	1 48	24
25	3 49	3 21	3 3	2 47	2 34	2 25	2 17	2 6	1 59	1 54	1 50	1 47	1 46	1 46	1 46	1 47	25
26	3 56	3 27	3 8	2 52	2 38	2 28	2 20	2 8	2 0	1 55	1 51	1 48	1 47	1 46	1 46	1 46	26
27	4 4	3 34	3 13	2 56	2 42	2 32	2 24	2 11	2 2	1 56	1 52	1 49	1 47	1 46	1 45	1 46	27
28	4 11	3 40	3 18	3 1	2 46	2 35	2 27	2 13	2 4	1 58	1 53	1 49	1 47	1 46	1 45	1 45	28
29	4 19	3 47	3 24	3 5	2 51	2 39	2 30	2 16	2 6	1 59	1 54	1 50	1 48	1 46	1 45	1 45	29
30	4 26	3 53	3 29	3 10	2 55	2 43	2 33	2 18	2 8	2 1	1 55	1 51	1 49	1 47	1 46	1 45	30
31	4 33	3 59	3 35	3 14	2 59	2 46	2 36	2 21	2 10	2 3	1 57	1 52	1 49	1 47	1 46	1 45	31
32	4 40	4 5	3 40	3 19	3 3	2 50	2 39	2 24	2 12	2 4	1 58	1 53	1 50	1 48	1 46	1 45	32
33	4 47	4 11	3 45	3 24	3 7	2 54	2 42	2 27	2 14	2 5	1 59	1 54	1 50	1 48	1 46	1 45	33
34	4 54	4 16	3 50	3 28	3 11	2 57	2 45	2 29	2 16	2 7	2 0	1 55	1 51	1 48	1 47	1 46	34
35	5 1	4 22	3 55	3 33	3 15	3 1	2 49	2 32	2 19	2 9	2 2	1 56	1 52	1 49	1 47	1 46	35
36	5 8	4 28	4 0	3 37	3 19	3 5	2 52	2 34	2 21	2 10	2 3	1 58	1 53	1 49	1 47	1 46	36
37	5 15	4 34	4 5	3 42	3 23	3 8	2 56	2 37	2 23	2 12	2 4	1 59	1 54	1 50	1 48	1 47	37
38	5 21	4 40	4 10	3 46	3 27	3 12	2 59	2 39	2 25	2 14	2 6	2 0	1 55	1 51	1 49	1 47	38
39	5 28	4 45	4 15	3 51	3 31	3 15	3 2	2 42	2 27	2 16	2 7	2 1	1 56	1 52	1 49	1 47	39
40	5 34	4 51	4 20	3 55	3 35	3 19	3 5	2 44	2 29	2 18	2 9	2 3	1 57	1 52	1 49	1 47	40
41	5 41	4 56	4 25	3 59	3 39	3 23	3 8	2 47	2 31	2 20	2 11	2 4	1 58	1 53	1 50	1 48	41
42	5 47	5 1	4 30	4 3	3 43	3 26	3 11	2 49	2 33	2 21	2 12	2 5	1 59	1 54	1 51	1 49	42
43	5 53	5 7	4 35	4 7	3 47	3 30	3 14	2 52	2 35	2 23	2 13	2 7	2 0	1 55	1 52	1 50	43
44	6 0	5 12	4 40	4 11	3 50	3 34	3 17	2 54	2 37	2 25	2 15	2 8	2 1	1 56	1 53	1 51	44
46	6 12	5 22	4 49	4 19	3 57	3 40	3 23	2 59	2 41	2 29	2 18	2 10	2 3	1 58	1 55	1 52	46
48	6 24	5 32	4 58	4 27	4 4	3 46	3 29	3 4	2 45	2 32	2 21	2 12	2 5	2 0	1 56	1 53	48
50	6 35	5 42	5 6	4 35	4 11	3 52	3 35	3 9	2 49	2 35	2 24	2 15	2 8	2 2	1 58	1 55	50
52	6 45	5 51	5 14	4 42	4 17	3 58	3 40	3 13	2 53	2 38	2 27	2 18	2 10	2 4	2 0	1 57	52
54	6 55	6 0	5 22	4 49	4 23	4 4	3 45	3 17	2 57	2 41	2 30	2 20	2 12	2 6	2 2	1 58	54
56	7 5	6 9	5 29	4 55	4 29	4 9	3 50	3 21	3 1	2 44	2 32	2 22	2 14	2 8	2 3	1 59	56
58	7 14	6 17	5 36	5 1	4 34	4 14	3 55	3 25	3 4	2 47	2 35	2 24	2 16	2 9	2 4	2 0	58
60	7 22	6 25	5 42	5 6	4 39	4 19	3 59	3 29	3 7	2 50	2 37	2 26	2 17	2 10	2 5	2 1	60
62	7 30	6 32	5 48	5 11	4 44	4 23	4 3	3 33	3 10	2 53	2 39	2 28	2 19	2 12	2 7	2 2	62
64	7 38	6 39	5 54	5 16	4 49	4 27	4 7	3 36	3 13	2 56	2 41	2 29	2 20	2 13	2 8	2 3	64
66	7 45	6 45	6 0	5 21	4 54	4 31	4 11	3 39	3 16	2 58	2 43	2 31	2 22	2 15	2 9	2 3	66
68	7 51	6 50	6 5	5 25	4 58	4 35	4 15	3 41	3 19	3 0	2 45	2 33	2 24	2 16	2 10	2 4	68
70	7 57	6 54	6 9	5 29	5 2	4 39	4 18	3 44	3 21	3 2	2 46	2 34	2 25	2 17	2 10		70
72	8 2	6 58	6 13	5 33	5 6	4 42	4 21	3 46	3 23	3 3	2 47	2 35	2 26	2 18			72
74	8 6	7 2	6 17	5 36	5 9	4 44	4 23	3 48	3 24	3 4	2 48	2 36	2 27				74
76	8 10	7 5	6 20	5 39	5 11	4 46	4 25	3 50	3 25	3 5	2 49	2 37					76
78	8 14	7 8	6 23	5 42	5 13	4 48	4 26	3 51	3 26	3 6	2 50						78
80	8 18	7 11	6 26	5 45	5 15	4 50	4 27	3 52	3 27	3 7							80
82	8 21	7 14	6 28	5 47	5 17	4 51	4 28	3 53	3 28								82
84	8 24	7 17	6 30	5 49	5 18	4 52	4 29	3 54									84
86	8 26	7 19	6 31	5 50	5 19	4 53	4 30										86
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	

THIRD CORRECTION, to APPARENT DISTANCE 84°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																								☽'s App Alt.
	32°		34°		36°		38°		42°		46°		50°		54°		58°		62°		66°		70°		74°		78°		82°		86°		
°	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	°
6	4	34	4	48	5	2	5	15	5	41	6	6	6	29	6	51	7	10	7	27	7	42	7	55	8	6	8	14	8	21	8	27	6
7	4	0	4	12	4	24	4	36	4	58	5	19	5	39	5	58	6	15	6	30	6	42	6	53	7	2	7	9	7	15	7	19	7
8	3	36	3	47	3	57	4	7	4	27	4	46	5	4	5	20	5	34	5	46	5	58	6	9	6	17	6	23	6	28	6	31	8
9	3	16	3	25	3	34	3	43	4	0	4	17	4	33	4	47	4	59	5	10	5	20	5	29	5	36	5	42	5	47	5	50	9
10	3	1	3	9	3	17	3	25	3	41	3	55	4	9	4	21	4	33	4	43	4	53	5	1	5	7	5	13	5	17	5	19	10
11	2	48	2	55	3	3	3	10	3	24	3	37	3	50	4	2	4	12	4	21	4	30	4	37	4	43	4	48	4	51	4	54	11
12	2	38	2	44	2	51	2	58	3	10	3	22	3	34	3	45	3	54	4	2	4	10	4	16	4	22	4	26	4	28	4	30	12
13	2	29	2	35	2	41	2	47	2	58	3	9	3	20	3	29	3	38	3	45	3	52	3	58	4	3	4	7	4	9			13
14	2	22	2	27	2	33	2	38	2	48	2	58	3	8	3	16	3	24	3	31	3	37	3	43	3	47	3	51	3	53			14
15	2	16	2	21	2	26	2	30	2	39	2	48	2	57	3	5	3	12	3	19	3	25	3	30	3	34	3	37	3	40			15
16	2	11	2	15	2	20	2	24	2	32	2	40	2	48	2	56	3	2	3	9	3	15	3	19	3	23	3	26	3	29			16
17	2	7	2	10	2	14	2	18	2	26	2	34	2	41	2	48	2	54	3	0	3	5	3	9	3	13	3	15					17
18	2	3	2	6	2	10	2	13	2	21	2	28	2	34	2	40	2	46	2	52	2	57	3	1	3	4	3	6					18
19	2	0	2	3	2	6	2	9	2	16	2	23	2	29	2	34	2	40	2	45	2	49	2	53	2	56	2	58					19
20	1	57	2	0	2	2	2	5	2	12	2	18	2	24	2	29	2	34	2	38	2	42	2	45	2	48	2	50					20
21	1	54	1	57	1	59	2	2	2	8	2	13	2	19	2	24	2	29	2	33	2	36	2	39	2	41							21
22	1	52	1	54	1	56	1	59	2	4	2	9	2	14	2	19	2	24	2	28	2	31	2	34	2	36							22
23	1	50	1	52	1	54	1	56	2	1	2	5	2	10	2	15	2	19	2	23	2	26	2	29	2	32							23
24	1	49	1	50	1	52	1	54	1	58	2	2	2	7	2	11	2	15	2	19	2	22	2	25	2	28							24
25	1	48	1	49	1	50	1	52	1	56	2	0	2	4	2	8	2	12	2	15	2	18	2	21									25
26	1	47	1	48	1	49	1	51	1	54	1	58	2	2	2	5	2	9	2	12	2	15	2	17									26
27	1	47	1	48	1	49	1	50	1	53	1	56	2	0	2	3	2	6	2	9	2	12	2	14									27
28	1	46	1	47	1	48	1	49	1	51	1	54	1	58	2	1	2	3	2	6	2	9	2	11									28
29	1	46	1	47	1	47	1	48	1	50	1	53	1	56	1	59	2	1	2	4	2	6											29
30	1	45	1	46	1	46	1	47	1	49	1	52	1	55	1	57	2	0	2	2	2	3											30
31	1	45	1	45	1	46	1	47	1	49	1	51	1	54	1	56	1	58	2	0	2	1											31
32	1	45	1	45	1	45	1	46	1	48	1	50	1	52	1	54	1	56	1	58	1	59											32
33	1	45	1	45	1	45	1	46	1	47	1	49	1	51	1	53	1	54	1	56													33
34	1	45	1	44	1	44	1	45	1	46	1	48	1	50	1	52	1	53	1	54													34
35	1	45	1	44	1	44	1	45	1	46	1	47	1	49	1	50	1	51	1	52													35
36	1	46	1	45	1	44	1	44	1	45	1	46	1	48	1	49	1	50	1	50													36
37	1	46	1	45	1	44	1	44	1	45	1	45	1	47	1	48	1	49															37
38	1	46	1	45	1	44	1	44	1	44	1	45	1	46	1	47	1	48															38
39	1	46	1	45	1	44	1	44	1	44	1	44	1	45	1	46	1	47															39
40	1	46	1	45	1	45	1	45	1	44	1	44	1	45	1	45	1	46															40
41	1	47	1	46	1	45	1	45	1	44	1	44	1	44	1	44																	41
42	1	48	1	47	1	46	1	45	1	43	1	43	1	44	1	44																	42
43	1	49	1	48	1	46	1	45	1	43	1	43	1	44	1	44																	43
44	1	49	1	48	1	47	1	45	1	43	1	43	1	43																			44
46	1	50	1	49	1	47	1	45	1	43	1	43	1	43																			46
48	1	51	1	50	1	48	1	46	1	44	1	43	1	42																			48
50	1	53	1	51	1	49	1	47	1	44	1	43																					50
52	1	54	1	51	1	49	1	47	1	44	1	42																					52
54	1	55	1	52	1	49	1	47	1	44																							54
56	1	56	1	53	1	50	1	48	1	44																							56
58	1	56	1	53	1	50	1	48																									58
60	1	57	1	54	1	51	1	48																									60
62	1	58	1	54	1	51																											62
64	1	59	1	55																													64
66	1	59																															66
68																																	68
70																																	70
72																																	72
74																																	74
76																																	76
78																																	78
80																																	80
82																																	82
84																																	84
86																																	86
	32°		34°		36°		38°		42°		46°		50°		54°		58°		62°		66°												

TABLE P. EFFECT OF SUN'S PAR.
To be subtracted from the third Correction.

☽'s App Alt.	Sun's Apparent Altitude.									
	5 ″	10 ″	20 ″	30 ″	40 ″	50 ″	60 ″	70 ″	80 ″	90 ″
°										
5	1	1	1	0	0	0	0	0	0	
10	1	1	1	1	1	1	1	1	1	0
15	2	2	2	2	2	2	2	2	1	
20	3	3	3	3	2	2	2	2		
25	4	4	3	3	3	3	3	3		
30	4	4	4	4	4	4	4	4		
35	5	5	5	5	5	4	4	4		
40	6	6	6	5	5	5	5	5		
45	6	6	6	6	6	6	6			
50	7	7	7	7	6	6	6			
55	7	7	7	7	7	7	7			
60	8	8	8	7	7	7				
65	8	8	8	8	8	8				
70	8	8	8	8	8					
75	9	9	9	9	8					
80	9	9	9							
90	9									

Third Correction, to Apparent Distance 88°

☽'s App Alt	APPARENT ALTITUDE OF THE SUN, OR STAR.															☽'s App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	1 53	1 54	1 56	1 59	2 4	2 10	2 16	2 28	2 42	2 56	3 11	3 26	3 41	3 56	4 11	4 25	6
7	1 55	1 53	1 54	1 56	1 59	2 3	2 7	2 16	2 27	2 39	2 51	3 4	3 16	3 28	3 40	3 52	7
8	1 58	1 55	1 53	1 54	1 56	1 59	2 2	2 8	2 17	2 27	2 37	2 48	2 59	3 9	3 19	3 30	8
9	2 2	1 58	1 55	1 53	1 54	1 56	1 58	2 3	2 10	2 18	2 26	2 35	2 45	2 54	3 3	3 12	9
10	2 7	2 1	1 57	1 55	1 53	1 54	1 56	2 0	2 5	2 11	2 18	2 25	2 34	2 43	2 50	2 58	10
11	2 13	2 5	2 0	1 57	1 55	1 53	1 54	1 57	2 1	2 6	2 12	2 18	2 25	2 32	2 39	2 47	11
12	2 19	2 10	2 4	2 0	1 57	1 54	1 53	1 55	1 58	2 2	2 7	2 12	2 18	2 24	2 30	2 37	12
13	2 26	2 15	2 8	2 3	1 59	1 56	1 54	1 54	1 56	1 59	2 3	2 7	2 12	2 18	2 23	2 29	13
14	2 33	2 21	2 12	2 6	2 1	1 58	1 56	1 53	1 55	1 57	2 0	2 3	2 7	2 12	2 17	2 22	14
15	2 40	2 26	2 16	2 9	2 4	2 0	1 57	1 54	1 54	1 55	1 58	2 0	2 4	2 8	2 13	2 17	15
16	2 47	2 32	2 20	2 13	2 7	2 2	1 59	1 55	1 53	1 54	1 56	1 58	2 1	2 5	2 9	2 13	16
17	2 54	2 37	2 25	2 17	2 10	2 5	2 1	1 56	1 53	1 53	1 55	1 57	1 59	2 2	2 5	2 9	17
18	3 2	2 43	2 30	2 21	2 13	2 7	2 3	1 58	1 54	1 52	1 54	1 56	1 58	2 0	2 2	2 5	18
19	3 10	2 49	2 35	2 25	2 16	2 10	2 5	1 59	1 55	1 53	1 53	1 54	1 56	1 58	2 0	2 3	19
20	3 17	2 55	2 41	2 29	2 20	2 13	2 8	2 1	1 56	1 54	1 52	1 53	1 54	1 56	1 58	2 1	20
21	3 25	3 2	2 46	2 34	2 24	2 17	2 11	2 3	1 58	1 55	1 53	1 52	1 53	1 55	1 57	1 59	21
22	3 32	3 8	2 52	2 39	2 28	2 20	2 14	2 5	1 59	1 56	1 53	1 52	1 53	1 54	1 55	1 57	22
23	3 40	3 15	2 57	2 43	2 32	2 24	2 17	2 7	2 1	1 57	1 54	1 52	1 52	1 53	1 54	1 55	23
24	3 47	3 21	3 2	2 48	2 36	2 27	2 20	2 9	2 2	1 58	1 55	1 53	1 52	1 52	1 53	1 54	24
25	3 55	3 27	3 8	2 52	2 40	2 31	2 23	2 11	2 4	2 0	1 56	1 53	1 52	1 52	1 53	1 54	25
26	4 2	3 33	3 13	2 57	2 44	2 35	2 27	2 14	2 6	2 1	1 57	1 54	1 53	1 52	1 52	1 53	26
27	4 10	3 39	3 18	3 2	2 48	2 38	2 30	2 17	2 8	2 2	1 58	1 55	1 53	1 52	1 52	1 52	27
28	4 17	3 45	3 23	3 6	2 52	2 42	2 33	2 19	2 10	2 4	1 59	1 55	1 53	1 52	1 52	1 52	28
29	4 24	3 51	3 28	3 11	2 56	2 46	2 37	2 22	2 12	2 5	2 0	1 56	1 53	1 52	1 52	1 52	29
30	4 31	3 57	3 34	3 15	3 0	2 49	2 40	2 24	2 14	2 6	2 1	1 57	1 54	1 53	1 52	1 52	30
31	4 39	4 3	3 40	3 20	3 4	2 53	2 43	2 27	2 16	2 8	2 2	1 58	1 55	1 53	1 52	1 52	31
32	4 46	4 9	3 45	3 25	3 8	2 56	2 46	2 29	2 18	2 9	2 3	1 59	1 56	1 54	1 53	1 52	32
33	4 53	4 15	3 51	3 29	3 12	3 0	2 50	2 31	2 20	2 11	2 5	2 0	1 56	1 54	1 53	1 53	33
34	5 0	4 21	3 56	3 34	3 17	3 4	2 53	2 34	2 22	2 13	2 7	2 1	1 57	1 55	1 54	1 53	34
35	5 7	4 27	4 1	3 38	3 21	3 7	2 56	2 37	2 24	2 15	2 8	2 2	1 58	1 56	1 54	1 53	35
36	5 13	4 33	4 6	3 43	3 25	3 11	2 59	2 40	2 26	2 17	2 10	2 4	1 59	1 56	1 54	1 53	36
37	5 20	4 39	4 11	3 48	3 29	3 15	3 2	2 43	2 28	2 19	2 11	2 5	2 0	1 57	1 55	1 54	37
38	5 27	4 45	4 16	3 52	3 33	3 18	3 5	2 46	2 31	2 21	2 13	2 6	2 1	1 58	1 56	1 54	38
39	5 34	4 51	4 21	3 57	3 37	3 22	3 8	2 49	2 33	2 22	2 14	2 7	2 1	1 58	1 56	1 55	39
40	5 40	4 56	4 26	4 1	3 41	3 25	3 11	2 51	2 35	2 24	2 16	2 9	2 3	1 59	1 57	1 55	40
41	5 47	5 2	4 31	4 5	3 45	3 29	3 14	2 54	2 38	2 26	2 17	2 10	2 4	2 0	1 57	1 55	41
42	5 53	5 7	4 36	4 9	3 49	3 32	3 17	2 56	2 40	2 28	2 19	2 11	2 5	2 1	1 58	1 56	42
43	6 0	5 13	4 41	4 14	3 53	3 36	3 20	2 59	2 42	2 30	2 20	2 12	2 6	2 2	1 59	1 57	43
44	6 6	5 19	4 46	4 18	3 57	3 39	3 23	3 1	2 44	2 32	2 22	2 13	2 7	2 3	2 0	1 58	44
46	6 18	5 29	4 55	4 26	4 4	3 46	3 29	3 6	2 48	2 35	2 25	2 16	2 9	2 5	2 2	1 59	46
48	6 29	5 39	5 4	4 34	4 11	3 52	3 35	3 11	2 52	2 39	2 28	2 18	2 11	2 7	2 3	2 0	48
50	6 40	5 48	5 12	4 41	4 17	3 58	3 41	3 15	2 56	2 42	2 31	2 21	2 13	2 9	2 5	2 2	50
52	6 51	5 57	5 20	4 48	4 23	4 2	3 47	3 19	2 59	2 45	2 34	2 24	2 16	2 10	2 6	2 3	52
54	7 1	6 6	5 28	4 55	4 29	4 8	3 52	3 23	3 3	2 48	2 36	2 27	2 18	2 12	2 8	2 4	54
56	7 10	6 15	5 35	5 1	4 35	4 14	3 57	3 27	3 7	2 51	2 39	2 29	2 20	2 14	2 9	2 5	56
58	7 19	6 23	5 42	5 7	4 40	4 19	4 2	3 31	3 10	2 54	2 42	2 31	2 22	2 16	2 11	2 6	58
60	7 28	6 31	5 48	5 12	4 45	4 24	4 6	3 35	3 13	2 57	2 44	2 33	2 24	2 17	2 12	2 7	60
62	7 36	6 38	5 54	5 17	4 50	4 29	4 10	3 38	3 16	2 59	2 46	2 35	2 26	2 19	2 13	2 8	62
64	7 44	6 45	6 0	5 22	4 55	4 33	4 14	3 42	3 19	3 2	2 48	2 37	2 28	2 20	2 14	2 9	64
66	7 51	6 51	6 5	5 27	5 0	4 37	4 18	3 45	3 22	3 4	2 50	2 39	2 30	2 22	2 15		66
68	7 58	6 56	6 10	5 32	5 4	4 41	4 21	3 48	3 25	3 6	2 51	2 40	2 31	2 23			68
70	8 4	7 1	6 15	5 36	5 8	4 44	4 23	3 50	3 27	3 8	2 53	2 41	2 32				70
72	8 10	7 5	6 19	5 40	5 11	4 47	4 25	3 52	3 29	3 9	2 53	2 42					72
74	8 15	7 9	6 23	5 43	5 14	4 49	4 27	3 54	3 30	3 10	2 54						74
76	8 19	7 13	6 26	5 46	5 17	4 51	4 29	3 56	3 31	3 11							76
78	8 22	7 16	6 29	5 49	5 19	4 53	4 31	3 57	3 32								78
80	8 25	7 19	6 31	5 52	5 21	4 55	4 33	3 58									80
82	8 28	7 22	6 33	5 54	5 23	4 57	4 35										82
84	8 30	7 24	6 35	5 56	5 25												84
86	8 32	7 26	6 37														86
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	

TABLE XVIII.

THIRD CORRECTION, to APPARENT DISTANCE 88°

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																☽'s App Alt.
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°	70°	74°	78°	82°	86°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	4 40	4 54	5 8	5 22	5 48	6 13	6 36	6 57	7 16	7 34	7 49	8 2	8 13	8 21	8 27	8 32	6
7	4 4	4 16	4 28	4 40	5 3	5 25	5 45	6 4	6 21	6 36	6 49	7 0	7 9	7 16	7 22	7 27	7
8	3 41	3 52	4 3	4 13	4 33	4 52	5 10	5 26	5 40	5 53	6 5	6 15	6 23	6 29	6 34	6 37	8
9	3 22	3 31	3 41	3 50	4 8	4 24	4 39	4 53	5 5	5 16	5 26	5 35	5 43	5 49	5 54		9
10	3 6	3 14	3 22	3 30	3 46	4 1	4 15	4 27	4 38	4 49	4 58	5 7	5 14	5 19	5 23		10
11	2 54	3 2	3 9	3 16	3 30	3 43	3 56	4 7	4 17	4 27	4 36	4 43	4 49	4 53	4 57		11
12	2 44	2 51	2 58	3 4	3 16	3 28	3 40	3 50	4 0	4 8	4 16	4 23	4 28	4 32	4 36		12
13	2 35	2 41	2 47	2 53	3 4	3 15	3 26	3 35	3 44	3 52	3 59	4 5	4 10	4 13			13
14	2 27	2 33	2 38	2 44	2 54	3 4	3 14	3 22	3 30	3 37	3 44	3 50	3 54	3 57			14
15	2 22	2 27	2 32	2 36	2 46	2 55	3 4	3 11	3 18	3 25	3 31	3 37	3 41	3 44			15
16	2 17	2 21	2 26	2 30	2 39	2 47	2 55	3 2	3 9	3 15	3 21	3 26	3 30	3 33			16
17	2 12	2 16	2 21	2 25	2 33	2 40	2 47	2 54	3 0	3 6	3 12	3 16	3 19				17
18	2 8	2 12	2 16	2 20	2 27	2 34	2 41	2 47	2 53	2 58	3 3	3 7	3 10				18
19	2 5	2 8	2 12	2 16	2 22	2 29	2 35	2 41	2 47	2 52	2 56	2 59	3 2				19
20	2 3	2 6	2 9	2 12	2 18	2 24	2 30	2 35	2 41	2 46	2 49	2 52	2 54				20
21	2 1	2 3	2 6	2 8	2 14	2 19	2 25	2 30	2 35	2 40	2 43	2 46					21
22	1 59	2 1	2 3	2 5	2 10	2 15	2 20	2 25	2 30	2 35	2 38	2 41					22
23	1 57	1 59	2 1	2 3	2 7	2 12	2 16	2 21	2 26	2 30	2 33	2 36					23
24	1 56	1 57	1 59	2 1	2 5	2 9	2 13	2 17	2 22	2 26	2 29	2 31					24
25	1 55	1 56	1 57	1 59	2 3	2 6	2 10	2 14	2 18	2 22	2 25						25
26	1 54	1 55	1 56	1 58	2 1	2 4	2 8	2 12	2 15	2 18	2 21						26
27	1 53	1 54	1 55	1 57	2 0	2 3	2 6	2 10	2 13	2 15	2 17						27
28	1 53	1 54	1 55	1 56	1 58	2 1	2 4	2 8	2 11	2 13	2 14						28
29	1 52	1 53	1 54	1 55	1 57	2 0	2 3	2 6	2 8	2 10							29
30	1 52	1 53	1 53	1 54	1 56	1 59	2 2	2 4	2 6	2 8							30
31	1 52	1 52	1 52	1 53	1 55	1 58	2 0	2 2	2 4	2 5							31
32	1 51	1 52	1 52	1 53	1 55	1 57	1 59	2 1	2 2	2 3							32
33	1 52	1 51	1 51	1 52	1 54	1 56	1 58	1 59	2 0								33
34	1 52	1 51	1 51	1 52	1 53	1 55	1 57	1 58	1 59								34
35	1 52	1 51	1 51	1 51	1 52	1 54	1 56	1 57	1 57								35
36	1 53	1 52	1 51	1 51	1 52	1 53	1 55	1 56	1 56								36
37	1 53	1 52	1 51	1 51	1 51	1 52	1 54	1 55									37
38	1 53	1 52	1 51	1 50	1 51	1 52	1 53	1 54									38
39	1 54	1 52	1 51	1 50	1 51	1 52	1 52	1 53									39
40	1 54	1 53	1 52	1 51	1 50	1 51	1 52	1 52									40
41	1 54	1 53	1 52	1 51	1 50	1 51	1 51										41
42	1 54	1 53	1 52	1 51	1 50	1 51	1 51										42
43	1 55	1 54	1 53	1 52	1 51	1 51	1 51										43
44	1 56	1 54	1 53	1 52	1 51	1 50	1 50										44
46	1 57	1 55	1 53	1 52	1 51	1 50											46
48	1 58	1 56	1 54	1 53	1 51	1 50											48
50	1 59	1 57	1 55	1 53	1 51												50
52	2 0	1 58	1 55	1 53	1 52												52
54	2 1	1 58	1 56	1 54													54
56	2 2	1 59	1 56	1 54													56
58	2 3	1 59	1 56														58
60	2 3	1 59															60
62	2 4																62
64																	64
66																	66
68																	68
70																	70
72																	72
74																	74
76																	76
78																	78
80																	80
82																	82
84																	84
86																	86
	32°	34°	36°	38°	42°	46°	50°	54°	58°	62°	66°						

TABLE P. EFFECT OF SUN'S PAR

To be subtracted from the third Correction.

☽'s App Alt.	Sun's Apparent Altitude.									
	5	10	20	30	40	50	60	70	80	90
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
5	1	1	1	1	1	1	1	0	1	0
10	2	2	2	2	2	2	2	1	2	
15	3	3	3	3	3	3	3	2		
20	3	4	4	4	4	4	4	3		
25	4	4	4	4	4	4	4			
30	4	5	5	5	5	5	5			
35	5	5	5	5	5	5				
40	6	6	6	6	6	6				
45	6	6	6	6	6	6				
50	7	7	7	7	7	7				
55	7	8	8	8	8					
60	8	8	8	8	8					
65	8	8	8	9	9					
70	8	9	9	9						
75	9	9	9							
80	9	9								
90	9									

TABLE XVIII.

Third Correction to Apparent Distance 96°

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																			☽'s App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°				
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″				°
6	2 6	2 8	2 10	2 13	2 17	2 22	2 28	2 41	2 55	3 10	3 26	3 41	3 56	4 11	4 26	4 41				6
7	2 9	2 6	2 8	2 10	2 12	2 16	2 20	2 29	2 40	2 52	3 5	3 18	3 31	3 43	3 56	4 8				7
8	2 12	2 8	2 6	2 7	2 9	2 12	2 15	2 22	2 31	2 40	2 51	3 2	3 13	3 24	3 35	3 45				8
9	2 16	2 11	2 8	2 6	2 7	2 9	2 12	2 17	2 24	2 31	2 40	2 49	2 59	3 8	3 18	3 27				9
10	2 20	2 14	2 10	2 8	2 6	2 7	2 9	2 13	2 18	2 24	2 32	2 40	2 48	2 56	3 4	3 12				10
11	2 26	2 18	2 13	2 10	2 7	2 6	2 7	2 10	2 14	2 19	2 25	2 32	2 39	2 46	2 53	3 1				11
12	2 32	2 23	2 17	2 13	2 9	2 7	2 6	2 8	2 11	2 15	2 20	2 26	2 32	2 38	2 45	2 52				12
13	2 39	2 28	2 21	2 16	2 12	2 9	2 7	2 7	2 9	2 12	2 16	2 21	2 26	2 32	2 38	2 44				13
14	2 46	2 33	2 25	2 19	2 14	2 11	2 9	2 6	2 8	2 10	2 13	2 18	2 22	2 27	2 32	2 37				14
15	2 53	2 39	2 29	2 22	2 17	2 14	2 11	2 7	2 7	2 9	2 11	2 15	2 19	2 23	2 28	2 32				15
16	3 1	2 45	2 34	2 26	2 20	2 16	2 13	2 8	2 5	2 8	2 10	2 13	2 16	2 20	2 24	2 28				16
17	3 8	2 51	2 39	2 30	2 23	2 19	2 15	2 9	2 7	2 7	2 9	2 11	2 14	2 17	2 21	2 24				17
18	3 15	2 57	2 44	2 34	2 26	2 21	2 17	2 11	2 8	2 6	2 8	2 10	2 12	2 15	2 18	2 21				18
19	3 23	3 3	2 49	2 38	2 30	2 24	2 19	2 13	2 9	2 7	2 7	2 8	2 10	2 13	2 15	2 18				19
20	3 30	3 9	2 54	2 43	2 34	2 27	2 22	2 15	2 11	2 8	2 6	2 7	2 9	2 11	2 13	2 15				20
21	3 38	3 16	3 0	2 48	2 37	2 30	2 25	2 17	2 12	2 9	2 7	2 7	2 8	2 9	2 11	2 13				21
22	3 46	3 22	3 5	2 52	2 41	2 33	2 28	2 19	2 14	2 10	2 8	2 6	2 7	2 8	2 10	2 12				22
23	3 54	3 28	3 11	2 57	2 45	2 37	2 31	2 21	2 15	2 11	2 8	2 6	2 6	2 7	2 9	2 11				23
24	4 1	3 34	3 16	3 1	2 49	2 41	2 35	2 23	2 17	2 12	2 9	2 7	2 6	2 7	2 8	2 10				24
25	4 9	3 41	3 22	3 6	2 53	2 45	2 38	2 26	2 19	2 14	2 11	2 8	2 6	2 7	2 8	2 9				25
26	4 16	3 47	3 27	3 11	2 57	2 48	2 41	2 29	2 21	2 16	2 12	2 9	2 7	2 6	2 7	2 8				26
27	4 24	3 53	3 33	3 15	3 1	2 52	2 44	2 31	2 23	2 17	2 13	2 10	2 8	2 6	2 6	2 7				27
28	4 31	4 0	3 38	3 20	3 6	2 55	2 47	2 34	2 24	2 18	2 14	2 11	2 9	2 7	2 6	2 7				28
29	4 39	4 6	3 44	3 25	3 10	2 59	2 50	2 36	2 26	2 20	2 15	2 12	2 10	2 8	2 7	2 6				29
30	4 46	4 12	3 49	3 29	3 14	3 2	2 53	2 38	2 28	2 21	2 16	2 13	2 10	2 8	2 7	2 6				30
31	4 53	4 18	3 55	3 34	3 18	3 7	2 57	2 41	2 30	2 23	2 18	2 14	2 11	2 9	2 8	2 7				31
32	5 0	4 24	4 0	3 39	3 23	3 11	3 1	2 44	2 32	2 25	2 19	2 15	2 12	2 9	2 8	2 7				32
33	5 7	4 30	4 5	3 44	3 27	3 15	3 4	2 46	2 34	2 26	2 20	2 16	2 13	2 10	2 8	2 7				33
34	5 14	4 36	4 11	3 49	3 32	3 19	3 7	2 48	2 36	2 28	2 21	2 17	2 14	2 11	2 9	2 8				34
35	5 21	4 42	4 16	3 54	3 36	3 23	3 11	2 51	2 38	2 30	2 23	2 18	2 15	2 12	2 10	2 8				35
36	5 28	4 48	4 21	3 59	3 40	3 26	3 14	2 54	2 40	2 32	2 25	2 20	2 16	2 13	2 11	2 9				36
37	5 35	4 54	4 26	4 3	3 44	3 29	3 17	2 57	2 43	2 33	2 26	2 21	2 17	2 14	2 11	2 9				37
38	5 42	5 0	4 31	4 8	3 48	3 33	3 20	2 59	2 45	2 35	2 27	2 22	2 18	2 15	2 12	2 10				38
39	5 49	5 6	4 36	4 12	3 52	3 36	3 23	3 2	2 47	2 37	2 29	2 23	2 19	2 16	2 13	2 11				39
40	5 55	5 12	4 41	4 16	3 56	3 40	3 26	3 5	2 50	2 39	2 30	2 24	2 20	2 16	2 13	2 11				40
41	6 2	5 18	4 46	4 20	4 0	3 44	3 30	3 7	2 52	2 41	2 32	2 25	2 21	2 17	2 14	2 12				41
42	6 8	5 23	4 51	4 24	4 4	3 47	3 33	3 10	2 54	2 43	2 34	2 27	2 22	2 18	2 15	2 13				42
43	6 14	5 29	4 56	4 29	4 8	3 51	3 36	3 13	2 57	2 45	2 35	2 28	2 23	2 19	2 16	2 13				43
44	6 20	5 34	5 1	4 33	4 11	3 54	3 39	3 16	2 59	2 47	2 37	2 29	2 24	2 20	2 17	2 14				44
45	6 26	5 39	5 6	4 37	4 14	3 57	3 42	3 19	3 1	2 48	2 38	2 30	2 25	2 21	2 17	2 14				45
46	6 32	5 44	5 10	4 41	4 18	4 0	3 45	3 21	3 3	2 50	2 39	2 31	2 26	2 22	2 18	2 15				46
47	6 38	5 49	5 15	4 45	4 22	4 3	3 48	3 24	3 5	2 52	2 41	2 33	2 27	2 23	2 19	2 16				47
48	6 44	5 54	5 19	4 49	4 25	4 7	3 51	3 26	3 7	2 53	2 42	2 34	2 28	2 24	2 20	2 16				48
49	6 50	5 59	5 23	4 53	4 29	4 10	3 54	3 28	3 9	2 55	2 44	2 36	2 29	2 25	2 21	2 17				49
50	6 55	6 4	5 27	4 57	4 32	4 13	3 57	3 30	3 11	2 56	2 45	2 37	2 31	2 26	2 21	2 17				50
51	7 0	6 9	5 31	5 1	4 36	4 16	4 0	3 32	3 13	2 58	2 47	2 38	2 32	2 27	2 22	2 18				51
52	7 5	6 14	5 35	5 4	4 39	4 19	4 3	3 34	3 15	3 0	2 48	2 39	2 33	2 28	2 23	2 18				52
54	7 15	6 23	5 43	5 11	4 45	4 25	4 8	3 38	3 19	3 2	2 51	2 42	2 35	2 29	2 24	2 19				54
56	7 25	6 31	5 51	5 18	4 51	4 30	4 13	3 42	3 22	3 6	2 54	2 45	2 37	2 30	2 25	2 19				56
58	7 35	6 39	5 58	5 24	4 56	4 35	4 17	3 46	3 26	3 9	2 57	2 47	2 39	2 31	2 25					58
60	7 45	6 46	6 4	5 30	5 1	4 39	4 21	3 50	3 29	3 12	2 59	2 49	2 41	2 32						60
62	7 54	6 53	6 10	5 35	5 6	4 44	4 25	3 54	3 32	3 15	3 1	2 50	2 42							62
64	8 2	7 0	6 16	5 40	5 11	4 48	4 29	3 58	3 35	3 17	3 3	2 51								64
66	8 10	7 7	6 21	5 45	5 16	4 52	4 33	4 1	3 38	3 19	3 4									66
68	8 17	7 13	6 26	5 50	5 21	4 56	4 36	4 3	3 40	3 21										68
70	8 24	7 18	6 31	5 54	5 25	5 0	4 39	4 5	3 42											70
72	8 29	7 23	6 36	5 58	5 28	5 3	4 41	4 7												72
74	8 33	7 27	6 40	6 1	5 31	5 6	4 43													74
76	8 37	7 31	6 43	6 4	5 34															76
78	8 40	7 34	6 46																	78
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°				

THIRD CORRECTION to APPARENT DISTANCE 96°

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																								☽'s App Alt.
	32°	34°	36°	38°	40°	42°	44°	46°	50°	54°	58°	62°	66°	70°	74°	78°									
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″									°
6	4 56	5 10	5 24	5 38	5 51	6 4	6 17	6 29	6 52	7 14	7 34	7 52	8 9	8 23	8 33	8 40									6
7	4 20	4 32	4 44	4 56	5 8	5 20	5 31	5 42	6 2	6 20	6 37	6 52	7 6	7 18	7 28	7 35									7
8	3 56	4 7	4 18	4 29	4 39	4 49	4 59	5 8	5 26	5 42	5 56	6 9	6 21	6 31	6 40	6 47									8
9	3 37	3 46	3 55	4 4	4 13	4 23	4 32	4 40	4 56	5 10	5 23	5 34	5 44	5 53	6 1										9
10	3 22	3 30	3 37	3 45	3 53	4 2	4 10	4 17	4 31	4 43	4 55	5 6	5 16	5 24	5 31										10
11	3 9	3 17	3 24	3 31	3 38	3 45	3 52	3 59	4 11	4 22	4 33	4 43	4 52	5 0	5 7										11
12	2 59	3 6	3 12	3 19	3 25	3 32	3 38	3 45	3 55	4 5	4 15	4 24	4 32	4 39	4 46										12
13	2 50	2 56	3 2	3 8	3 14	3 20	3 26	3 32	3 42	3 51	4 0	4 8	4 15	4 21											13
14	2 42	2 48	2 53	2 58	3 4	3 9	3 15	3 20	3 30	3 39	3 48	3 55	4 1	4 6											14
15	2 36	2 41	2 46	2 50	2 55	3 0	3 5	3 10	3 19	3 28	3 36	3 43	3 49	3 54											15
16	2 32	2 36	2 40	2 44	2 48	2 53	2 57	3 2	3 10	3 18	3 25	3 32	3 38	3 44											16
17	2 28	2 31	2 35	2 39	2 43	2 47	2 51	2 55	3 3	3 10	3 16	3 22	3 28												17
18	2 24	2 27	2 31	2 35	2 38	2 42	2 45	2 49	2 56	3 2	3 8	3 14	3 19												18
19	2 21	2 24	2 27	2 31	2 34	2 37	2 40	2 44	2 50	2 56	3 2	3 7	3 11												19
20	2 18	2 21	2 24	2 27	2 30	2 33	2 36	2 39	2 45	2 51	2 56	3 1	3 4												20
21	2 16	2 19	2 21	2 24	2 26	2 29	2 32	2 35	2 41	2 46	2 51	2 55													21
22	2 14	2 17	2 19	2 21	2 23	2 26	2 28	2 31	2 37	2 42	2 46	2 50													22
23	2 13	2 15	2 17	2 19	2 21	2 23	2 25	2 28	2 33	2 38	2 42	2 45													23
24	2 11	2 13	2 15	2 17	2 19	2 21	2 23	2 25	2 30	2 35	2 38	2 41													24
25	2 10	2 11	2 13	2 15	2 17	2 19	2 21	2 23	2 27	2 31	2 35														25
26	2 9	2 10	2 12	2 13	2 15	2 17	2 19	2 21	2 25	2 28	2 31														26
27	2 8	2 9	2 11	2 12	2 14	2 16	2 18	2 20	2 23	2 25	2 27														27
28	2 8	2 9	2 10	2 11	2 13	2 15	2 17	2 18	2 21	2 23	2 24														28
29	2 7	2 8	2 9	2 10	2 12	2 13	2 15	2 17	2 19	2 21															29
30	2 7	2 8	2 9	2 10	2 11	2 12	2 14	2 15	2 17	2 19															30
31	2 6	2 7	2 8	2 9	2 10	2 11	2 12	2 14	2 16	2 17															31
32	2 6	2 7	2 7	2 8	2 9	2 10	2 11	2 12	2 14	2 16															32
33	2 6	2 6	2 7	2 7	2 8	2 9	2 10	2 11	2 13																33
34	2 7	2 6	2 7	2 7	2 8	2 9	2 10	2 11	2 12																34
35	2 7	2 6	2 6	2 7	2 7	2 8	2 9	2 10	2 11																35
36	2 8	2 7	2 6	2 6	2 7	2 8	2 9	2 9	2 10																36
37	2 8	2 7	2 6	2 6	2 7	2 7	2 8	2 8																	37
38	2 9	2 8	2 7	2 6	2 6	2 7	2 8	2 8																	38
39	2 9	2 8	2 7	2 6	2 6	2 7	2 7	2 8																	39
40	2 10	2 8	2 7	2 6	2 6	2 6	2 7	2 7																	40
41	2 10	2 9	2 8	2 7	2 7	2 7	2 6	2 6																	41
42	2 11	2 9	2 8	2 7	2 7	2 7	2 6	2 6																	42
43	2 11	2 10	2 8	2 7	2 7	2 7	2 6																		43
44	2 12	2 10	2 8	2 7	2 7	2 7	2 6																		44
45	2 12	2 10	2 9	2 8	2 7																				45
46	2 13	2 11	2 9	2 8	2 7																				46
47	2 13	2 11	2 9	2 8																					47
48	2 13	2 11	2 9	2 8																					48
49	2 14	2 12	2 10																						49
50	2 14	2 12	2 10																						50
51	2 14	2 12																							51
52	2 15	2 12																							52
54	2 15																								54
56																									56
58																									58
60																									60
62																									62
64																									64
66																									66
68																									68
70																									70
72																									72
74																									74
76																									76
78																									78
	32°	34°	36°	38°	40°	42°	44°	46°	50°	54°	58°														

TABLE P. EFFECT OF SUN'S PAR.
To be subtracted from the third Correction.

☽'s App Alt.	Sun's Apparent Altitude.								
	5	10	20	30	40	50	60	70	80	90
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
5	1	1	1	1	1	1	2	2	2	
10	2	2	2	2	2	3	3	3		
15	2	2	3	3	3	4	4	4		
20	3	3	3	4	4	4	5	5		
25	4	4	4	4	5	5	5			
30	5	5	5	5	5	6	6			
35	5	5	5	6	6	6				
40	6	6	6	6	6	7				
45	6	7	7	7	7					
50	7	7	7	7	8					
55	7	8	8	8						
60	8	8	8	8						
65	8	8	8							
70	9	9	9							
75	9	9								
80	9									
90										

TABLE XVIII.

Third Correction, to Apparent Distance 100°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																					☽'s App Alt
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°						
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″						°
6	2 13	2 15	2 18	2 21	2 25	2 31	2 37	2 49	3 3	3 18	3 33	3 48	4 4	4 19	4 34	4 49						6
7	2 16	2 13	2 15	2 17	2 20	2 24	2 29	2 38	2 49	3 1	3 13	3 25	3 38	3 50	4 3	4 16						7
8	2 19	2 15	2 13	2 14	2 16	2 19	2 23	2 31	2 39	2 49	2 59	3 10	3 21	3 32	3 43	3 54						8
9	2 23	2 18	2 15	2 13	2 14	2 16	2 19	2 25	2 32	2 40	2 48	2 58	3 7	3 16	3 26	3 35						9
10	2 28	2 22	2 18	2 15	2 13	2 14	2 16	2 21	2 26	2 33	2 40	2 48	2 56	3 4	3 13	3 21						10
11	2 33	2 26	2 21	2 17	2 15	2 13	2 14	2 18	2 22	2 27	2 33	2 40	2 47	2 54	3 2	3 10						11
12	2 40	2 30	2 24	2 20	2 17	2 14	2 13	2 16	2 19	2 23	2 28	2 34	2 40	2 46	2 53	3 0						12
13	2 47	2 35	2 28	2 23	2 19	2 16	2 14	2 14	2 17	2 20	2 24	2 29	2 34	2 40	2 45	2 51						13
14	2 54	2 40	2 32	2 26	2 21	2 18	2 16	2 13	2 15	2 18	2 21	2 25	2 30	2 35	2 39	2 44						14
15	3 1	2 46	2 36	2 29	2 24	2 21	2 18	2 14	2 14	2 16	2 19	2 22	2 26	2 30	2 34	2 39						15
16	3 8	2 52	2 41	2 33	2 27	2 23	2 20	2 16	2 13	2 15	2 17	2 20	2 23	2 26	2 30	2 35						16
17	3 15	2 58	2 46	2 37	2 30	2 25	2 22	2 17	2 14	2 14	2 16	2 18	2 21	2 24	2 27	2 31						17
18	3 23	3 4	2 51	2 41	2 33	2 28	2 24	2 19	2 15	2 13	2 15	2 17	2 19	2 22	2 25	2 28						18
19	3 30	3 11	2 56	2 45	2 37	2 31	2 26	2 20	2 16	2 14	2 14	2 16	2 17	2 20	2 22	2 25						19
20	3 38	3 17	3 2	2 50	2 41	2 34	2 29	2 22	2 18	2 15	2 13	2 15	2 16	2 18	2 20	2 23						20
21	3 45	3 24	3 8	2 54	2 45	2 38	2 32	2 24	2 19	2 16	2 14	2 14	2 15	2 17	2 19	2 21						21
22	3 53	3 30	3 13	2 59	2 49	2 41	2 35	2 26	2 21	2 18	2 15	2 13	2 14	2 16	2 18	2 20						22
23	4 1	3 36	3 19	3 4	2 53	2 45	2 38	2 28	2 23	2 19	2 16	2 13	2 13	2 15	2 17	2 19						23
24	4 9	3 42	3 24	3 9	2 58	2 49	2 42	2 31	2 24	2 20	2 17	2 14	2 13	2 14	2 16	2 18						24
25	4 16	3 49	3 30	3 14	3 2	2 53	2 45	2 33	2 26	2 21	2 18	2 15	2 14	2 14	2 15	2 17						25
26	4 24	3 55	3 35	3 19	3 6	2 56	2 48	2 36	2 28	2 23	2 19	2 16	2 14	2 14	2 15	2 16						26
27	4 31	4 2	3 41	3 24	3 11	3 0	2 51	2 38	2 30	2 24	2 20	2 17	2 15	2 14	2 14	2 15						27
28	4 39	4 8	3 46	3 28	3 15	3 4	2 54	2 40	2 32	2 25	2 21	2 18	2 16	2 15	2 14	2 15						28
29	4 46	4 14	3 52	3 33	3 19	3 7	2 58	2 43	2 34	2 26	2 22	2 19	2 17	2 15	2 14	2 14						29
30	4 54	4 20	3 57	3 38	3 23	3 11	3 1	2 45	2 36	2 28	2 24	2 21	2 18	2 16	2 15	2 14						30
31	5 1	4 26	4 3	3 42	3 27	3 15	3 5	2 48	2 38	2 30	2 25	2 22	2 19	2 17	2 15	2 14						31
32	5 8	4 33	4 8	3 47	3 31	3 18	3 8	2 51	2 40	2 32	2 27	2 23	2 20	2 17	2 16	2 15						32
33	5 16	4 39	4 14	3 52	3 36	3 22	3 11	2 54	2 42	2 33	2 28	2 24	2 21	2 18	2 16	2 15						33
34	5 23	4 45	4 19	3 57	3 40	3 26	3 15	2 56	2 44	2 35	2 29	2 25	2 22	2 19	2 17	2 16						34
35	5 30	4 51	4 24	4 2	3 44	3 30	3 18	2 59	2 46	2 37	2 31	2 26	2 23	2 20	2 18	2 16						35
36	5 37	4 57	4 29	4 7	3 48	3 34	3 22	3 2	2 49	2 39	2 32	2 28	2 24	2 20	2 18	2 17						36
37	5 44	5 3	4 35	4 12	3 52	3 38	3 25	3 5	2 51	2 41	2 34	2 29	2 25	2 21	2 19	2 18						37
38	5 51	5 9	4 40	4 16	3 56	3 41	3 28	3 8	2 54	2 43	2 36	2 30	2 26	2 22	2 20	2 18						38
39	5 58	5 15	4 45	4 21	4 0	3 45	3 31	3 11	2 56	2 45	2 37	2 31	2 27	2 23	2 21	2 19						39
40	6 4	5 21	4 50	4 25	4 4	3 48	3 34	3 14	2 58	2 47	2 38	2 32	2 28	2 24	2 22	2 20						40
41	6 11	5 27	4 55	4 29	4 8	3 52	3 38	3 17	3 1	2 49	2 40	2 34	2 29	2 25	2 22	2 20						41
42	6 18	5 33	5 0	4 33	4 12	3 55	3 41	3 19	3 3	2 51	2 41	2 35	2 30	2 26	2 23	2 21						42
43	6 24	5 38	5 5	4 38	4 16	3 59	3 44	3 22	3 6	2 53	2 43	2 36	2 31	2 27	2 24	2 22						43
44	6 30	5 44	5 9	4 42	4 20	4 2	3 47	3 24	3 8	2 55	2 45	2 38	2 32	2 28	2 25	2 22						44
45	6 36	5 49	5 14	4 46	4 24	4 6	3 50	3 27	3 10	2 57	2 47	2 39	2 33	2 29	2 26	2 23						45
46	6 42	5 54	5 18	4 50	4 27	4 9	3 53	3 29	3 12	2 59	2 48	2 41	2 35	2 30	2 27	2 24						46
47	6 48	5 59	5 23	4 54	4 31	4 12	3 56	3 32	3 14	3 0	2 50	2 42	2 36	2 31	2 28	2 25						47
48	6 54	6 4	5 27	4 58	4 34	4 15	3 59	3 34	3 16	3 2	2 51	2 43	2 37	2 32	2 28	2 25						48
49	7 0	6 9	5 32	5 2	4 38	4 18	4 2	3 37	3 18	3 4	2 53	2 45	2 38	2 33	2 29	2 26						49
50	7 5	6 14	5 36	5 6	4 41	4 21	4 5	3 39	3 20	3 5	2 54	2 46	2 39	2 34	2 30	2 26						50
51	7 11	6 19	5 41	5 10	4 45	4 24	4 8	3 42	3 22	3 7	2 55	2 47	2 40	2 35	2 31	2 27						51
52	7 16	6 24	5 45	5 14	4 48	4 27	4 11	3 44	3 24	3 9	2 57	2 49	2 42	2 36	2 31	2 27						52
53	7 21	6 29	5 49	5 17	4 52	4 30	4 14	3 46	3 26	3 11	2 59	2 50	2 43	2 37	2 32							53
54	7 26	6 34	5 53	5 21	4 55	4 33	4 16	3 48	3 28	3 12	3 0	2 51	2 44	2 37	2 32							54
55	7 31	6 39	5 57	5 24	4 58	4 36	4 19	3 50	3 30	3 14	3 1	2 52	2 45	2 38								55
56	7 36	6 43	6 0	5 27	5 1	4 39	4 22	3 52	3 32	3 16	3 2	2 53	2 46	2 39								56
58	7 46	6 51	6 7	5 33	5 7	4 44	4 26	3 56	3 36	3 19	3 5	2 55	2 47									58
60	7 56	6 58	6 14	5 39	5 12	4 49	4 31	4 0	3 39	3 22	3 8	2 57										60
62	8 5	7 5	6 20	5 45	5 17	4 54	4 36	4 4	3 42	3 24	3 10											62
64	8 13	7 12	6 26	5 51	5 22	4 59	4 40	4 7	3 45	3 26												64
66	8 21	7 19	6 32	5 57	5 27	5 3	4 43	4 10	3 47													66
68	8 28	7 25	6 38	6 2	5 32	5 7	4 45	4 13														68
70	8 35	7 30	6 43	6 7	5 36	5 11	4 48															70
72	8 40	7 35	6 47	6 11	5 40																	72
74	8 44	7 40	6 51																			74
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°						

TABLE XVIII.

Third Correction, to Apparent Distance 100°.

D's App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR																			D's App Alt.
	32°	34°	36°	38°	40°	42°	44°	46°	48°	50°	54°	58°	62°	66°	70°	74°				
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″				°
6	5 4	5 19	5 34	5 48	6 2	6 15	6 28	6 41	6 53	7 4	7 25	7 46	8 5	8 20	8 33	8 44				6
7	4 29	4 41	4 54	5 6	5 18	5 30	5 41	5 52	6 3	6 13	6 32	6 50	7 6	7 19	7 30	7 40				7
8	4 5	4 16	4 27	4 38	4 48	4 58	5 8	5 17	5 26	5 35	5 52	6 7	6 20	6 32	6 43	7 52				8
9	3 45	3 55	4 5	4 15	4 24	4 32	4 41	4 49	4 57	5 4	5 19	5 33	5 45	5 56	6 7					9
10	3 30	3 39	3 47	3 55	4 3	4 11	4 19	4 26	4 33	4 40	4 54	5 6	5 16	5 26	5 36					10
11	3 18	3 26	3 33	3 40	3 47	3 54	4 1	4 8	4 15	4 21	4 33	4 44	4 54	5 3	5 12					11
12	3 7	3 14	3 21	3 27	3 34	3 40	3 47	3 53	3 59	4 4	4 15	4 25	4 34	4 43	4 52					12
13	2 58	3 4	3 10	3 16	3 22	3 28	3 34	3 40	3 46	3 51	4 0	4 9	4 17	4 25						13
14	2 50	2 56	3 1	3 7	3 12	3 18	3 23	3 29	3 34	3 39	3 48	3 56	4 4	4 10						14
15	2 44	2 49	2 54	2 59	3 4	3 9	3 14	3 19	3 24	3 28	3 37	3 45	3 52	3 59						15
16	2 39	2 44	2 48	2 52	2 57	3 2	3 7	3 11	3 15	3 19	3 27	3 35	3 42	3 49						16
17	2 35	2 39	2 43	2 47	2 51	2 56	3 0	3 4	3 8	3 12	3 19	3 26	3 33							17
18	2 31	2 35	2 38	2 42	2 46	2 50	2 54	2 58	3 1	3 5	3 12	3 18	3 24							18
19	2 28	2 31	2 34	2 38	2 42	2 45	2 49	2 52	2 55	2 59	3 5	3 11	3 16							19
20	2 25	2 28	2 31	2 35	2 38	2 41	2 44	2 47	2 50	2 54	3 0	3 5	3 10							20
21	2 23	2 26	2 29	2 32	2 35	2 38	2 40	2 43	2 46	2 49	2 55	3 0								21
22	2 22	2 24	2 27	2 29	2 32	2 35	2 37	2 40	2 43	2 45	2 50	2 55								22
23	2 21	2 23	2 25	2 27	2 29	2 32	2 34	2 37	2 40	2 42	2 46	2 50								23
24	2 20	2 22	2 23	2 25	2 27	2 29	2 32	2 35	2 37	2 39	2 43	2 46								24
25	2 19	2 20	2 21	2 23	2 25	2 27	2 30	2 32	2 34	2 36	2 40									25
26	2 18	2 19	2 20	2 21	2 23	2 25	2 28	2 30	2 32	2 34	2 37									26
27	2 17	2 18	2 19	2 20	2 22	2 24	2 26	2 28	2 30	2 32	2 34									27
28	2 16	2 17	2 18	2 19	2 21	2 23	2 24	2 26	2 28	2 30	2 31									28
29	2 15	2 16	2 17	2 18	2 20	2 22	2 23	2 25	2 26	2 28										29
30	2 15	2 16	2 17	2 18	2 19	2 21	2 22	2 24	2 25	2 26										30
31	2 14	2 15	2 16	2 17	2 18	2 20	2 21	2 22	2 23	2 24										31
32	2 14	2 15	2 16	2 17	2 18	2 19	2 20	2 21	2 22	2 23										32
33	2 15	2 15	2 15	2 16	2 17	2 18	2 19	2 20	2 21											33
34	2 15	2 15	2 15	2 16	2 17	2 18	2 19	2 19	2 20											34
35	2 15	2 15	2 15	2 15	2 16	2 17	2 18	2 18												35
36	2 16	2 15	2 15	2 15	2 16	2 17	2 17	2 18												36
37	2 17	2 16	2 15	2 15	2 16	2 16	2 17													37
38	2 17	2 16	2 15	2 15	2 16	2 16	2 17													38
39	2 18	2 17	2 16	2 16	2 16	2 16														39
40	2 18	2 17	2 16	2 16	2 16	2 16														40
41	2 19	2 18	2 17	2 16	2 16															41
42	2 19	2 18	2 17	2 16	2 16															42
43	2 20	2 18	2 17	2 16																43
44	2 20	2 19	2 17	2 16																44
45	2 21	2 19	2 17																	45
46	2 21	2 19	2 17																	46
47	2 22	2 19																		47
48	2 22	2 19																		48
49	2 23																			49
50	2 23																			50
51																				51
52																				52
53																				53
54																				54
55																				55
56																				56
58																				58
60																				60
62																				62
64																				64
66																				66
68																				68
70																				70
72																				72
74																				74
	32°	34°	36°	38°	40°	42°	44°	46°	48°	50°	54°									

TABLE P. EFFECT OF SUN'S PAR

To be subtracted from the third Correction.

D's App Alt.	Sun's Apparent Altitude.								
	5	10	20	30	40	50	60	70	75	80
	″	″	″	″	″	″	″	″	″	″
5	1	1	1	2	2	2	2	2	2	
10	2	2	2	2	3	3	3	3		
15	2	3	3	3	3	4	4	4		
20	3	3	4	4	4	4	4	5		
25	4	4	4	5	5	5	5			
30	5	5	5	5	6	6	6			
35	5	5	6	6	6	6				
40	6	6	6	7	7					
45	7	7	7	7						
50	7	7	7	8						
55	8	8	8							
60	8	8	8							
65	8	9								
70	9	9								
75	9									

TABLE XVIII

Third Correction, to Apparent Distance 104°

D's App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.															D's App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	2 20	2 22	2 25	2 29	2 33	2 39	2 45	2 58	3 13	3 28	3 43	3 59	4 15	4 30	4 46	5 1	6
7	2 23	2 20	2 22	2 25	2 28	2 32	2 36	2 46	2 57	3 10	3 23	3 36	3 48	4 1	4 14	4 27	7
8	2 26	2 22	2 26	2 22	2 24	2 27	2 30	2 38	2 47	2 57	3 8	3 20	3 31	3 42	3 53	4 4	8
9	2 30	2 25	2 22	2 21	2 22	2 21	2 26	2 32	2 39	2 48	2 57	3 7	3 17	3 26	3 36	3 46	9
10	2 36	2 29	2 25	2 22	2 21	2 22	2 24	2 28	2 34	2 41	2 48	2 56	3 5	3 14	3 23	3 31	10
11	2 42	2 34	2 28	2 24	2 22	2 21	2 22	2 25	2 30	2 35	2 41	2 48	2 55	3 4	3 11	3 19	11
12	2 48	2 39	2 32	2 27	2 24	2 22	2 21	2 23	2 27	2 31	2 36	2 42	2 48	2 56	3 2	3 9	12
13	2 55	2 44	2 36	2 30	2 26	2 24	2 22	2 22	2 25	2 28	2 32	2 38	2 43	2 49	2 55	3 1	13
14	3 2	2 49	2 40	2 33	2 29	2 26	2 24	2 22	2 23	2 26	2 30	2 34	2 39	2 43	2 48	2 54	14
15	3 9	2 54	2 45	2 37	2 32	2 28	2 26	2 23	2 22	2 25	2 28	2 31	2 35	2 39	2 43	2 48	15
16	3 16	3 0	2 50	2 41	2 35	2 31	2 28	2 24	2 22	2 24	2 26	2 29	2 32	2 35	2 39	2 44	16
17	3 23	3 6	2 55	2 45	2 38	2 33	2 30	2 26	2 23	2 23	2 25	2 27	2 30	2 33	2 36	2 40	17
18	3 31	3 13	3 0	2 49	2 41	2 36	2 33	2 27	2 24	2 22	2 24	2 26	2 28	2 31	2 34	2 37	18
19	3 38	3 19	3 5	2 53	2 45	2 39	2 35	2 29	2 25	2 23	2 23	2 24	2 26	2 29	2 31	2 34	19
20	3 46	3 25	3 11	2 58	2 49	2 43	2 38	2 31	2 27	2 24	2 22	2 23	2 25	2 27	2 29	2 32	20
21	3 54	3 32	3 16	3 3	2 53	2 46	2 41	2 33	2 28	2 25	2 23	2 22	2 24	2 26	2 28	2 30	21
22	4 2	3 38	3 22	3 8	2 57	2 50	2 44	2 35	2 30	2 26	2 24	2 22	2 23	2 25	2 27	2 29	22
23	4 10	3 45	3 27	3 13	3 2	2 54	2 47	2 38	2 32	2 28	2 25	2 23	2 22	2 24	2 26	2 28	23
24	4 18	3 51	3 33	3 18	3 6	2 57	2 50	2 40	2 33	2 29	2 26	2 24	2 22	2 23	2 25	2 27	24
25	4 26	3 58	3 39	3 22	3 10	3 1	2 54	2 42	2 35	2 30	2 27	2 24	2 23	2 23	2 24	2 26	25
26	4 33	4 4	3 44	3 27	3 15	3 5	2 57	2 44	2 36	2 31	2 28	2 25	2 24	2 23	2 24	2 26	26
27	4 41	4 11	3 50	3 32	3 19	3 9	3 0	2 47	2 38	2 32	2 29	2 26	2 24	2 23	2 24	2 25	27
28	4 49	4 18	3 56	3 37	3 23	3 12	3 3	2 49	2 40	2 34	2 30	2 27	2 25	2 24	2 24	2 25	28
29	4 57	4 24	4 1	3 42	3 28	3 16	3 7	2 52	2 42	2 35	2 31	2 28	2 26	2 25	2 24	2 25	29
30	5 4	4 30	4 7	3 47	3 32	3 20	3 10	2 55	2 44	2 37	2 33	2 30	2 27	2 25	2 24	2 24	30
31	5 12	4 37	4 13	3 52	3 36	3 24	3 14	2 58	2 46	2 39	2 34	2 31	2 28	2 26	2 25	2 24	31
32	5 19	4 44	4 19	3 57	3 41	3 28	3 17	3 0	2 49	2 41	2 36	2 32	2 29	2 27	2 26	2 25	32
33	5 27	4 51	4 25	4 2	3 46	3 32	3 21	3 3	2 51	2 43	2 37	2 33	2 30	2 28	2 26	2 25	33
34	5 34	4 58	4 30	4 7	3 50	3 36	3 24	3 5	2 54	2 45	2 39	2 34	2 31	2 29	2 27	2 26	34
35	5 42	5 4	4 36	4 12	3 55	3 40	3 27	3 8	2 56	2 47	2 40	2 35	2 32	2 30	2 28	2 27	35
36	5 49	5 10	4 41	4 17	3 59	3 44	3 31	3 11	2 58	2 49	2 42	2 37	2 33	2 30	2 28	2 27	36
37	5 56	5 16	4 46	4 21	4 3	3 47	3 35	3 14	3 1	2 51	2 43	2 38	2 34	2 31	2 29	2 27	37
38	6 3	5 22	4 51	4 26	4 7	3 51	3 38	3 17	3 4	2 53	2 45	2 39	2 35	2 32	2 30	2 28	38
39	6 10	5 28	4 56	4 31	4 11	3 55	3 41	3 20	3 6	2 55	2 47	2 41	2 36	2 33	2 31	2 29	39
40	6 16	5 33	5 1	4 36	4 15	3 59	3 45	3 23	3 9	2 57	2 49	2 42	2 37	2 34	2 32	2 30	40
41	6 23	5 39	5 6	4 40	4 19	4 3	3 49	3 26	3 11	2 59	2 51	2 44	2 39	2 35	2 32	2 30	41
42	6 30	5 44	5 11	4 44	4 23	4 6	3 53	3 29	3 13	3 1	2 52	2 45	2 40	2 36	2 33	2 31	42
43	6 37	5 50	5 16	4 49	4 27	4 10	3 56	3 32	3 15	3 3	2 54	2 47	2 41	2 37	2 34	2 31	43
44	6 43	5 55	5 21	4 53	4 31	4 13	3 59	3 35	3 18	3 5	2 55	2 48	2 42	2 38	2 35	2 32	44
45	6 50	6 1	5 26	4 58	4 35	4 17	4 2	3 38	3 20	3 6	2 57	2 50	2 44	2 39	2 35	2 32	45
46	6 56	6 6	5 31	5 2	4 39	4 20	4 5	3 40	3 22	3 8	2 58	2 51	2 45	2 40	2 36	2 33	46
47	7 2	6 12	5 36	5 6	4 43	4 24	4 8	3 43	3 24	3 10	3 0	2 52	2 46	2 41	2 37	2 34	47
48	7 8	6 17	5 40	5 10	4 46	4 27	4 11	3 45	3 26	3 12	3 1	2 53	2 48	2 42	2 38	2 34	48
49	7 14	6 23	5 45	5 14	4 50	4 30	4 14	3 47	3 28	3 14	3 3	2 55	2 49	2 43	2 38		49
50	7 20	6 28	5 49	5 18	4 53	4 33	4 17	3 50	3 30	3 16	3 4	2 56	2 50	2 44	2 39		50
51	7 26	6 33	5 53	5 22	4 57	4 36	4 20	3 52	3 32	3 18	3 6	2 58	2 51	2 45			51
52	7 32	6 38	5 57	5 26	5 0	4 39	4 23	3 54	3 34	3 20	3 8	2 59	2 52	2 45			52
53	7 37	6 43	6 2	5 29	5 4	4 42	4 26	3 56	3 36	3 22	3 9	3 0	2 52				53
54	7 42	6 48	6 6	5 33	5 7	4 45	4 29	3 58	3 38	3 23	3 10	3 1	2 53				54
55	7 47	6 53	6 10	5 36	5 10	4 48	4 32	4 0	3 40	3 25	3 12	3 1					55
56	7 52	6 57	6 14	5 40	5 13	4 51	4 34	4 3	3 42	3 26	3 13	3 2					56
57	7 57	7 1	6 18	5 44	5 16	4 54	4 37	4 5	3 44	3 28	3 14						57
58	8 2	7 5	6 22	5 47	5 19	4 57	4 39	4 7	3 46	3 29	3 15						58
59	8 6	7 9	6 26	5 50	5 22	5 0	4 41	4 9	3 48	3 31							59
60	8 10	7 13	6 30	5 53	5 25	5 2	4 43	4 11	3 50	3 32							60
62	8 19	7 19	6 36	5 59	5 30	5 6	4 47	4 15	3 52								62
64	8 27	7 26	6 42	6 4	5 35	5 10	4 51	4 19									64
66	8 35	7 33	6 47	6 9	5 40	5 14	4 54										66
68	8 43	7 39	6 52	6 14	5 45												68
70	8 49	7 45	6 57														70
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	

THIRD CORRECTION, to APPARENT DISTANCE 104°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																				☽'s App Alt.
	32°	34°	36°	38°	40°	42°	44°	46°	48°	50°	52°	54°	58°	62°	66°	70°					
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″					°
6	5 16	5 31	5 45	6 0	6 14	6 28	6 41	6 54	7 6	7 18	7 29	7 40	8 0	8 19	8 35	8 49					6
7	4 42	4 56	5 8	5 20	5 31	5 42	5 53	6 4	6 15	6 26	6 37	6 47	7 4	7 19	7 33	7 46					7
8	4 16	4 28	4 39	4 49	4 59	5 9	5 19	5 28	5 38	5 47	5 57	6 6	6 21	6 34	6 46	6 57					8
9	3 55	4 5	4 15	4 25	4 34	4 43	4 52	5 0	5 8	5 16	5 24	5 32	5 46	5 58	6 9						9
10	3 40	3 49	3 58	4 7	4 15	4 23	4 31	4 38	4 45	4 52	4 59	5 6	5 18	5 30	5 40						10
11	3 27	3 35	3 43	3 51	3 58	4 5	4 12	4 19	4 26	4 32	4 38	4 44	4 55	5 6	5 16						11
12	3 16	3 23	3 30	3 37	3 44	3 51	3 58	4 4	4 10	4 17	4 23	4 28	4 38	4 47	4 56						12
13	3 7	3 13	3 20	3 26	3 33	3 39	3 45	3 51	3 56	4 2	4 7	4 12	4 22	4 30							13
14	2 59	3 5	3 11	3 17	3 23	3 29	3 34	3 39	3 44	3 49	3 54	3 59	4 8	4 15							14
15	2 53	2 58	3 4	3 9	3 15	3 20	3 25	3 29	3 34	3 38	3 43	3 47	3 56	4 3							15
16	2 48	2 53	2 58	3 3	3 8	3 12	3 17	3 21	3 25	3 29	3 33	3 37	3 45	3 52							16
17	2 44	2 49	2 53	2 58	3 2	3 6	3 10	3 14	3 17	3 21	3 25	3 29	3 36								17
18	2 41	2 45	2 49	2 53	2 57	3 1	3 4	3 8	3 11	3 15	3 18	3 22	3 29								18
19	2 38	2 41	2 45	2 49	2 53	2 56	2 59	3 3	3 6	3 9	3 12	3 16	3 22								19
20	2 35	2 38	2 42	2 45	2 49	2 52	2 55	2 58	3 1	3 4	3 7	3 10	3 16								20
21	2 33	2 36	2 39	2 42	2 45	2 48	2 51	2 54	2 57	3 0	3 3	3 5									21
22	2 31	2 34	2 36	2 39	2 42	2 45	2 47	2 50	2 53	2 56	2 59	3 1									22
23	2 30	2 32	2 34	2 37	2 39	2 42	2 44	2 47	2 50	2 53	2 55	2 57									23
24	2 29	2 31	2 33	2 35	2 37	2 40	2 42	2 44	2 47	2 50	2 52	2 54									24
25	2 28	2 29	2 31	2 33	2 35	2 38	2 40	2 42	2 44	2 47	2 49										25
26	2 27	2 28	2 30	2 32	2 34	2 36	2 38	2 40	2 42	2 44	2 46										26
27	2 26	2 27	2 29	2 31	2 32	2 34	2 36	2 38	2 40	2 41											27
28	2 26	2 27	2 28	2 30	2 31	2 33	2 35	2 36	2 38	2 39											28
29	2 25	2 26	2 27	2 29	2 30	2 32	2 33	2 34	2 36												29
30	2 25	2 26	2 27	2 28	2 29	2 31	2 32	2 33	2 34												30
31	2 24	2 25	2 26	2 27	2 28	2 30	2 31	2 32													31
32	2 24	2 25	2 26	2 27	2 28	2 29	2 30	2 31													32
33	2 24	2 24	2 25	2 26	2 27	2 28	2 29														33
34	2 25	2 24	2 25	2 26	2 27	2 27	2 28														34
35	2 26	2 25	2 25	2 26	2 26	2 27															35
36	2 26	2 25	2 25	2 26	2 26	2 27															36
37	2 26	2 25	2 25	2 26	2 26																37
38	2 27	2 26	2 26	2 26	2 26																38
39	2 27	2 26	2 26	2 26																	39
40	2 28	2 27	2 26	2 26																	40
41	2 28	2 27	2 26																		41
42	2 29	2 27	2 26																		42
43	2 29	2 27																			43
44	2 30	2 28																			44
45	2 30																				45
46	2 31																				46
47																					47
48																					48
49																					49
50																					50
51																					51
52																					52
53																					53
54																					54
55																					55
56																					56
57																					57
58																					58
59																					59
60																					60
62																					62
64																					64
66																					66
68																					68
70																					70
	32°	34°	36°	38°	40°	42°	44°	46°	48°	50°	52°										

TABLE P. EFFECT OF SUN'S PAR.
To be subtracted from the third Correction.

☽'s App Alt.	Sun's Apparent Altitude.									
	5	10	20	30	40	50	60	70	80	90
	″	″	″	″	″	″	″	″	″	″
5	1	1	2	2	2	3	3	3		
10	2	2	2	3	3	4	4	4		
15	2	3	3	3	4	4	5			
20	3	3	4	4	5	5				
25	4	4	5	5	5	6				
30	5	5	5	6	6	6				
35	6	6	6	6	7	7				
40	6	6	7	7	7					
45	7	7	7	8	8					
50	8	8	8	8						
55	8	8	8	9						
60	9	9	9							
65	9	9								
70										

TABLE XVIII.

Third Correction, to Apparent Distance 108°

D's App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.															D's App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	2 30	2 32	2 35	2 39	2 44	2 50	2 56	3 9	3 24	3 39	3 55	4 11	4 27	4 43	4 59	5 15	6
7	2 33	2 30	2 32	2 35	2 39	2 43	2 48	2 58	3 10	3 22	3 35	3 48	4 2	4 15	4 28	4 41	7
8	2 36	2 32	2 30	2 32	2 35	2 38	2 42	2 49	2 58	3 9	3 20	3 31	3 42	3 54	4 6	4 17	8
9	2 40	2 35	2 32	2 31	2 33	2 35	2 38	2 43	2 50	2 58	3 8	3 18	3 28	3 38	3 48	3 58	9
10	2 46	2 39	2 35	2 33	2 31	2 33	2 35	2 39	2 44	2 51	2 59	3 7	3 16	3 25	3 34	3 43	10
11	2 52	2 44	2 38	2 35	2 33	2 32	2 33	2 37	2 41	2 46	2 53	3 0	3 7	3 15	3 23	3 30	11
12	2 59	2 49	2 42	2 38	2 35	2 33	2 32	2 35	2 39	2 43	2 48	2 54	3 0	3 7	3 14	3 20	12
13	3 6	2 54	2 46	2 41	2 37	2 35	2 33	2 34	2 37	2 40	2 44	2 49	2 54	3 0	3 6	3 12	13
14	3 13	2 59	2 51	2 44	2 40	2 37	2 35	2 33	2 35	2 38	2 41	2 45	2 49	2 54	2 59	3 5	14
15	3 20	3 5	2 56	2 48	2 43	2 39	2 37	2 34	2 34	2 36	2 39	2 42	2 46	2 50	2 54	2 59	15
16	3 28	3 11	3 1	2 52	2 46	2 42	2 39	2 35	2 33	2 35	2 37	2 40	2 43	2 46	2 50	2 54	16
17	3 35	3 17	3 6	2 56	2 49	2 45	2 42	2 37	2 34	2 34	2 35	2 38	2 40	2 43	2 47	2 50	17
18	3 43	3 24	3 11	3 0	2 53	2 48	2 44	2 39	2 35	2 33	2 34	2 36	2 38	2 41	2 44	2 47	18
19	3 50	3 31	3 17	3 5	2 57	2 51	2 46	2 40	2 36	2 34	2 33	2 35	2 37	2 39	2 42	2 45	19
20	3 58	3 37	3 22	3 10	3 1	2 54	2 49	2 42	2 38	2 35	2 33	2 34	2 36	2 38	2 40	2 43	20
21	4 6	3 44	3 28	3 14	3 4	2 57	2 52	2 44	2 39	2 36	2 34	2 34	2 35	2 37	2 39	2 41	21
22	4 14	3 51	3 34	3 19	3 8	3 0	2 55	2 46	2 41	2 37	2 35	2 34	2 35	2 36	2 38	2 40	22
23	4 22	3 58	3 40	3 24	3 12	3 4	2 58	2 48	2 42	2 38	2 36	2 34	2 34	2 35	2 37	2 39	23
24	4 30	4 4	3 46	3 29	3 17	3 8	3 1	2 50	2 44	2 40	2 37	2 35	2 34	2 35	2 36	2 38	24
25	4 38	4 11	3 51	3 34	3 22	3 12	3 4	2 53	2 46	2 41	2 38	2 36	2 34	2 34	2 35	2 37	25
26	4 46	4 18	3 57	3 39	3 26	3 16	3 8	2 55	2 48	2 43	2 39	2 37	2 35	2 34	2 35	2 36	26
27	4 54	4 25	4 3	3 44	3 31	3 20	3 11	2 58	2 50	2 44	2 40	2 38	2 36	2 35	2 34	2 35	27
28	5 2	4 31	4 9	3 49	3 35	3 24	3 15	3 0	2 52	2 46	2 42	2 39	2 37	2 35	2 34	2 35	28
29	5 10	4 37	4 15	3 54	3 40	3 28	3 18	3 3	2 54	2 47	2 43	2 40	2 38	2 36	2 35	2 35	29
30	5 18	4 44	4 21	3 59	3 44	3 32	3 22	3 6	2 56	2 49	2 45	2 41	2 38	2 36	2 35	2 35	30
31	5 26	4 51	4 27	4 4	3 48	3 36	3 25	3 9	2 58	2 50	2 46	2 42	2 39	2 37	2 36	2 35	31
32	5 33	4 58	4 33	4 9	3 52	3 40	3 28	3 11	3 0	2 52	2 47	2 43	2 40	2 38	2 37	2 36	32
33	5 41	5 5	4 38	4 14	3 57	3 44	3 32	3 14	3 2	2 54	2 48	2 44	2 41	2 39	2 37	2 36	33
34	5 48	5 11	4 43	4 19	4 1	3 47	3 36	3 17	3 5	2 56	2 50	2 45	2 42	2 40	2 38	2 37	34
35	5 56	5 18	4 49	4 24	4 5	3 51	3 39	3 20	3 7	2 58	2 51	2 46	2 43	2 41	2 39	2 37	35
36	6 3	5 24	4 55	4 29	4 10	3 55	3 42	3 23	3 9	3 0	2 53	2 48	2 44	2 42	2 40	2 38	36
37	6 10	5 30	5 0	4 34	4 14	3 59	3 46	3 26	3 12	3 2	2 55	2 49	2 45	2 42	2 40	2 38	37
38	6 17	5 36	5 5	4 39	4 19	4 3	3 50	3 29	3 15	3 4	2 57	2 51	2 46	2 43	2 41	2 39	38
39	6 24	5 42	5 10	4 44	4 24	4 7	3 54	3 32	3 17	3 6	2 58	2 52	2 47	2 44	2 42	2 40	39
40	6 31	5 48	5 15	4 49	4 28	4 11	3 57	3 35	3 20	3 8	3 0	2 54	2 49	2 45	2 43	2 40	40
41	6 38	5 54	5 20	4 54	4 33	4 15	4 1	3 38	3 22	3 10	3 1	2 55	2 50	2 46	2 43	2 41	41
42	6 45	5 59	5 25	4 58	4 37	4 18	4 5	3 41	3 24	3 12	3 3	2 56	2 51	2 47	2 44	2 41	42
43	6 52	6 5	5 30	5 3	4 41	4 22	4 9	3 44	3 27	3 14	3 5	2 58	2 52	2 48	2 45	2 42	43
44	6 59	6 11	5 36	5 7	4 45	4 26	4 12	3 47	3 29	3 16	3 6	2 59	2 53	2 49	2 46	2 43	44
45	7 6	6 17	5 41	5 12	4 49	4 30	4 16	3 50	3 31	3 18	3 8	3 1	2 55	2 50	2 47		45
46	7 12	6 22	5 46	5 16	4 53	4 34	4 19	3 52	3 33	3 20	3 10	3 2	2 56	2 51	2 47		46
47	7 18	6 27	5 51	5 20	4 57	4 37	4 22	3 55	3 36	3 22	3 12	3 4	2 58	2 52			47
48	7 24	6 32	5 56	5 24	5 0	4 41	4 25	3 57	3 38	3 24	3 13	3 5	2 59	2 53			48
49	7 30	6 37	6 1	5 28	5 4	4 44	4 28	4 0	3 41	3 26	3 15	3 7	3 0				49
50	7 36	6 42	6 5	5 32	5 7	4 47	4 31	4 2	3 43	3 28	3 17	3 8	3 1				50
51	7 42	6 47	6 10	5 36	5 11	4 50	4 34	4 5	3 45	3 30	3 18	3 9					51
52	7 47	6 52	6 14	5 40	5 14	4 53	4 37	4 7	3 47	3 32	3 19	3 10					52
53	7 53	6 57	6 18	5 43	5 18	4 56	4 39	4 10	3 49	3 34	3 20						53
54	7 58	7 2	6 22	5 47	5 21	4 59	4 42	4 12	3 51	3 35	3 21						54
55	8 4	7 7	6 26	5 51	5 24	5 2	4 45	4 14	3 53	3 36							55
56	8 9	7 11	6 30	5 54	5 27	5 5	4 47	4 16	3 55	3 38							56
57	8 14	7 16	6 34	5 58	5 30	5 8	4 50	4 18	3 57								57
58	8 19	7 20	6 38	6 1	5 33	5 11	4 52	4 20	3 58								58
59	8 24	7 25	6 42	6 4	5 36	5 14	4 54	4 22									59
60	8 28	7 29	6 45	6 8	5 39	5 16	4 56	4 24									60
61	8 33	7 33	6 48	6 11	5 42	5 19	4 58										61
62	8 37	7 37	6 51	6 14	5 45	5 21	5 0										62
63	8 41	7 40	6 54	6 17	5 48	5 23											63
64	8 45	7 43	6 57	6 20													64
66	8 53	7 46	7 0														66
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	

THIRD CORRECTION, to APPARENT DISTANCE 108°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																☽'s App Alt.
	32°	34°	36°	38°	40°	42°	44°	46°	48°	50°	52°	54°	56°	58°	62°	66°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	5 30	5 45	6 0	6 15	6 29	6 44	6 58	7 11	7 23	7 34	7 45	7 56	8 6	8 16	8 35	8 53	6
7	4 55	5 8	5 21	5 34	5 46	5 58	6 10	6 22	6 33	6 43	6 53	7 2	7 11	7 20	7 35	7 47	7
8	4 29	4 41	4 52	5 3	5 13	5 23	5 34	5 44	5 54	6 4	6 13	6 22	6 30	6 38	6 51	7 1	8
9	4 8	4 18	4 28	4 38	4 48	4 57	5 6	5 15	5 23	5 31	5 38	5 45	5 53	6 1	6 14		9
10	3 52	4 0	4 9	4 18	4 27	4 36	4 44	4 52	4 59	5 6	5 13	5 20	5 27	5 33	5 45		10
11	3 38	3 46	3 54	4 2	4 10	4 18	4 25	4 33	4 40	4 47	4 53	4 59	5 5	5 11	5 20		11
12	3 27	3 34	3 41	3 48	3 56	4 4	4 11	4 18	4 24	4 30	4 36	4 42	4 47	4 52	5 0		12
13	3 18	3 24	3 30	3 37	3 44	3 51	3 58	4 4	4 10	4 15	4 21	4 26	4 30	4 34			13
14	3 10	3 16	3 22	3 28	3 34	3 40	3 46	3 52	3 58	4 3	4 8	4 12	4 16	4 20			14
15	3 4	3 9	3 14	3 20	3 25	3 31	3 36	3 42	3 47	3 52	3 56	4 1	4 5	4 8			15
16	2 59	3 3	3 8	3 13	3 18	3 23	3 28	3 33	3 38	3 43	3 47	3 51	3 55	3 58			16
17	2 54	2 58	3 3	3 7	3 12	3 17	3 21	3 26	3 30	3 35	3 39	3 43	3 46				17
18	2 51	2 54	2 59	3 3	3 7	3 11	3 15	3 20	3 24	3 28	3 32	3 35	3 38				18
19	2 48	2 51	2 55	2 59	3 3	3 6	3 10	3 14	3 18	3 22	3 25	3 28					19
20	2 46	2 49	2 52	2 56	2 59	3 2	3 6	3 9	3 13	3 16	3 19	3 22					20
21	2 44	2 47	2 50	2 53	2 56	2 59	3 2	3 5	3 9	3 12	3 14						21
22	2 42	2 45	2 48	2 50	2 53	2 56	2 59	3 2	3 5	3 8	3 10						22
23	2 41	2 43	2 46	2 48	2 50	2 53	2 56	2 59	3 2	3 4							23
24	2 40	2 42	2 44	2 46	2 48	2 51	2 53	2 56	2 59	3 1							24
25	2 39	2 40	2 42	2 44	2 46	2 49	2 51	2 53	2 56								25
26	2 38	2 39	2 41	2 43	2 45	2 47	2 49	2 51	2 54								26
27	2 37	2 38	2 40	2 42	2 44	2 45	2 47	2 49									27
28	2 36	2 38	2 39	2 41	2 42	2 44	2 46	2 47									28
29	2 36	2 37	2 38	2 40	2 41	2 42	2 44										29
30	2 35	2 36	2 37	2 39	2 40	2 41	2 43										30
31	2 35	2 36	2 37	2 38	2 39	2 40											31
32	2 35	2 36	2 37	2 38	2 39	2 40											32
33	2 36	2 36	2 36	2 37	2 38												33
34	2 36	2 36	2 36	2 37	2 38												34
35	2 36	2 36	2 36	2 37													35
36	2 37	2 36	2 36	2 36													36
37	2 38	2 37	2 36														37
38	2 38	2 37	2 36														38
39	2 39	2 38															39
40	2 39	2 38															40
41	2 40																41
42	2 40																42
43																	43
44																	44
45																	45
46																	46
47																	47
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49																	49
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55																	55
56																	56
57																	57
58																	58
59																	59
60																	60
61																	61
62																	62
63																	63
64																	64
66																	66
	32°	34°	36°	38°	40°	42°	44°	46°	48°	50°	52°						

TABLE ☽. EFFECT OF SUN'S PAR.
To be subtracted from the third Correction.

☽'s App. Alt.	Sun's Apparent Altitude.								
	5	10	20	30	40	50	60	65	80	90
	″	″	″	″	″	″	″	″	″	″
5	1	1	2	2	3	3	3	3		
10	2	2	3	3	4	4	4			
15	3	3	3	4	4	5	5			
20	4	4	4	5	5	5				
25	4	4	5	6	6	6				
30	5	5	6	6	7					
35	6	6	6	7	7					
40	6	7	7	8						
45	7	7	8	8						
50	8	8	8							
55	8	8	9							
60	8	9								
65	9									
70										

TABLE XVIII.

Third Correction to Apparent Distance 112°.

☽'s App Alt.	Apparent Altitude of the Sun, or Star.																☽'s App Alt.
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	2 40	2 42	2 45	2 49	2 54	3 0	3 7	3 21	3 36	3 52	4 8	4 24	4 40	4 56	5 12	5 28	6
7	2 42	2 40	2 42	2 45	2 49	2 53	2 58	3 8	3 20	3 33	3 46	3 59	4 13	4 26	4 40	4 54	7
8	2 46	2 42	2 41	2 43	2 45	2 48	2 52	3 0	3 9	3 19	3 31	3 42	3 54	4 6	4 18	4 30	8
9	2 51	2 45	2 43	2 41	2 43	2 45	2 48	2 54	3 1	3 9	3 19	3 29	3 40	3 50	4 0	4 11	9
10	2 57	2 49	2 45	2 43	2 42	2 43	2 45	2 49	2 55	3 2	3 10	3 19	3 28	3 37	3 46	3 56	10
11	3 3	2 54	2 48	2 45	2 43	2 42	2 43	2 46	2 50	2 56	3 3	3 11	3 19	3 27	3 35	3 44	11
12	3 9	2 59	2 52	2 48	2 45	2 43	2 42	2 44	2 47	2 52	2 58	3 5	3 12	3 19	3 26	3 34	12
13	3 16	3 4	2 56	2 51	2 47	2 45	2 43	2 43	2 45	2 49	2 54	3 0	3 6	3 12	3 18	3 25	13
14	3 23	3 10	3 0	2 54	2 50	2 47	2 45	2 43	2 44	2 47	2 51	2 56	3 1	3 6	3 12	3 17	14
15	3 31	3 16	3 5	2 58	2 53	2 49	2 47	2 44	2 44	2 46	2 49	2 53	2 57	3 1	3 6	3 11	15
16	3 39	3 22	3 10	3 2	2 56	2 51	2 48	2 45	2 43	2 45	2 47	2 50	2 54	2 57	3 2	3 6	16
17	3 47	3 29	3 15	3 6	2 59	2 54	2 50	2 46	2 44	2 44	2 46	2 48	2 51	2 54	2 58	3 2	17
18	3 55	3 35	3 20	3 10	3 2	2 57	2 53	2 48	2 45	2 44	2 45	2 47	2 49	2 52	2 55	2 59	18
19	4 3	3 41	3 26	3 15	3 6	3 0	2 56	2 50	2 46	2 45	2 44	2 46	2 48	2 50	2 53	2 56	19
20	4 11	3 48	3 32	3 20	3 10	3 3	2 58	2 52	2 48	2 45	2 44	2 45	2 47	2 49	2 51	2 54	20
21	4 19	3 54	3 38	3 25	3 15	3 7	3 1	2 54	2 49	2 46	2 44	2 44	2 46	2 48	2 50	2 52	21
22	4 27	4 1	3 44	3 30	3 20	3 11	3 5	2 56	2 51	2 47	2 45	2 44	2 45	2 47	2 49	2 51	22
23	4 35	4 8	3 50	3 35	3 24	3 15	3 8	2 58	2 52	2 48	2 46	2 45	2 44	2 46	2 48	2 50	23
24	4 43	4 15	3 56	3 40	3 28	3 19	3 11	3 1	2 54	2 49	2 47	2 45	2 44	2 45	2 47	2 49	24
25	4 52	4 22	4 3	3 46	3 33	3 23	3 15	3 2	2 55	2 51	2 48	2 46	2 45	2 44	2 46	2 48	25
26	5 0	4 29	4 9	3 51	3 38	3 27	3 18	3 5	2 57	2 52	2 49	2 47	2 45	2 44	2 45	2 47	26
27	5 8	4 37	4 15	3 56	3 42	3 31	3 22	3 8	2 59	2 54	2 51	2 48	2 45	2 45	2 45	2 46	27
28	5 16	4 44	4 21	4 2	3 47	3 36	3 26	3 11	3 2	2 56	2 52	2 49	2 46	2 46	2 45	2 46	28
29	5 24	4 51	4 27	4 7	3 52	3 40	3 31	3 14	3 5	2 58	2 53	2 50	2 46	2 46	2 45	2 46	29
30	5 32	4 57	4 33	4 12	3 57	3 45	3 35	3 17	3 7	3 0	2 55	2 52	2 47	2 47	2 46	2 46	30
31	5 40	5 4	4 39	4 17	4 2	3 49	3 39	3 20	3 9	3 2	2 57	2 53	2 49	2 48	2 47	2 46	31
32	5 48	5 10	4 45	4 22	4 7	3 54	3 43	3 23	3 12	3 4	2 58	2 54	2 51	2 49	2 47	2 46	32
33	5 56	5 17	4 51	4 28	4 12	3 58	3 46	3 26	3 14	3 6	3 0	2 55	2 52	2 50	2 48	2 47	33
34	6 4	5 24	4 56	4 33	4 16	4 2	3 50	3 29	3 17	3 8	3 2	2 57	2 53	2 51	2 49	2 48	34
35	6 11	5 31	5 2	4 38	4 21	4 6	3 53	3 32	3 19	3 10	3 4	2 59	2 55	2 52	2 50	2 49	35
36	6 19	5 37	5 7	4 43	4 25	4 10	3 57	3 35	3 21	3 12	3 5	3 0	2 56	2 53	2 51	2 49	36
37	6 26	5 44	5 13	4 48	4 29	4 14	4 1	3 38	3 24	3 14	3 7	3 1	2 57	2 54	2 52	2 50	37
38	6 33	5 50	5 18	4 53	4 33	4 17	4 4	3 41	3 26	3 16	3 9	3 3	2 58	2 55	2 53	2 51	38
39	6 41	5 56	5 24	4 58	4 37	4 21	4 8	3 44	3 29	3 18	3 10	3 4	2 59	2 56	2 54	2 52	39
40	6 48	6 2	5 29	5 3	4 41	4 25	4 11	3 47	3 32	3 20	3 12	3 6	3 1	2 57	2 55	2 53	40
41	6 55	6 8	5 35	5 8	4 45	4 28	4 15	3 50	3 35	3 22	3 13	3 7	3 2	2 58	2 55		41
42	7 2	6 14	5 40	5 13	4 49	4 32	4 18	3 53	3 38	3 25	3 15	3 8	3 3	2 59	2 56		42
43	7 8	6 20	5 46	5 18	4 53	4 36	4 22	3 56	3 40	3 27	3 17	3 10	3 5	3 0			43
44	7 15	6 26	5 51	5 23	4 58	4 40	4 25	3 59	3 42	3 29	3 19	3 12	3 6	3 1			44
45	7 22	6 32	5 56	5 28	5 3	4 44	4 28	4 2	3 45	3 31	3 21	3 14	3 8				45
46	7 28	6 38	6 2	5 33	5 8	4 47	4 31	4 5	3 47	3 33	3 23	3 15	3 9				46
47	7 35	6 44	6 7	5 37	5 12	4 51	4 34	4 8	3 50	3 36	3 25	3 16					47
48	7 42	6 49	6 12	5 41	5 16	4 55	4 38	4 11	3 52	3 38	3 26	3 17					48
49	7 48	6 54	6 16	5 45	5 20	4 58	4 41	4 14	3 55	3 40	3 28						49
50	7 55	6 59	6 21	5 49	5 23	5 2	4 44	4 17	3 57	3 42	3 29						50
51	8 1	7 4	6 25	5 53	5 27	5 5	4 47	4 19	3 59	3 44							51
52	8 7	7 9	6 29	5 57	5 30	5 8	4 50	4 22	4 1	3 46							52
53	8 13	7 14	6 34	6 1	5 34	5 12	4 53	4 24	4 3								53
54	8 19	7 19	6 38	6 5	5 37	5 15	4 56	4 26	4 4								54
55	8 25	7 23	6 42	6 8	5 41	5 18	4 59	4 28									55
56	8 30	7 28	6 47	6 12	5 44	5 21	5 1	4 30									56
57	8 35	7 33	6 51	6 15	5 47	5 24	5 4										57
58	8 40	7 38	6 55	6 19	5 50	5 27	5 6										58
59	8 45	7 43	6 59	6 22	5 53	5 29											59
60	8 50	7 48	7 2	6 25	5 56												60
61	8 54	7 52	7 5	6 28													61
62	8 58	7 56	7 8														62
63	9 2	7 59															63
64	9 5																64
65																	65
	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	

THIRD CORRECTION, to APPARENT DISTANCE 112°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																								☽'s App Alt.
	32°		34°		36°		38°		40°		42°		44°		46°		48°		50°		52°		54°		56°		58°		60°		62°		
°	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	°
6	5	44	6	0	6	16	6	31	6	46	7	0	7	14	7	27	7	40	7	53	8	5	8	18	8	30	8	41	8	50	8	58	6
7	5	7	5	21	5	34	5	47	6	0	6	13	6	25	6	37	6	49	7	0	7	10	7	20	7	30	7	39	7	47	7	55	7
8	4	42	4	54	5	5	5	16	5	27	5	38	5	49	6	0	6	10	6	20	6	29	6	38	6	47	6	55	7	2	7	8	8
9	4	21	4	32	4	42	4	52	5	1	5	11	5	21	5	31	5	40	5	48	5	56	6	4	6	11	6	18	6	24			9
10	4	5	4	14	4	23	4	32	4	40	4	49	4	58	5	7	5	15	5	23	5	31	5	38	5	44	5	50	5	55			10
11	3	52	4	0	4	8	4	16	4	23	4	31	4	39	4	47	4	55	5	2	5	8	5	14	5	19	5	24					11
12	3	41	3	48	3	55	4	2	4	9	4	16	4	24	4	31	4	38	4	44	4	50	4	56	5	1	5	5					12
13	3	31	3	38	3	44	3	50	3	57	4	4	4	10	4	17	4	23	4	29	4	35	4	40	4	45							13
14	3	23	3	29	3	35	3	41	3	47	3	53	3	59	4	6	4	12	4	17	4	22	4	26	4	30							14
15	3	16	3	21	3	27	3	33	3	38	3	44	3	50	3	56	4	1	4	6	4	10	4	14									15
16	3	10	3	15	3	21	3	26	3	31	3	37	3	42	3	47	3	52	3	57	4	1	4	4									16
17	3	6	3	11	3	16	3	20	3	25	3	30	3	35	3	40	3	45	3	49	3	53											17
18	3	3	3	7	3	12	3	16	3	20	3	25	3	29	3	34	3	38	3	42	3	46											18
19	3	0	3	4	3	8	3	12	3	16	3	20	3	24	3	28	3	32	3	35													19
20	2	57	3	1	3	5	3	8	3	12	3	16	3	20	3	23	3	26	3	29													20
21	2	55	2	58	3	2	3	5	3	9	3	12	3	16	3	19	3	22															21
22	2	53	2	56	3	0	3	3	3	6	3	9	3	12	3	15	3	18															22
23	2	52	2	55	2	58	3	1	3	3	3	6	3	9	3	12																	23
24	2	51	2	53	2	56	2	59	3	1	3	4	3	7	3	9																	24
25	2	50	2	52	2	54	2	57	2	59	3	1	3	4																			25
26	2	49	2	51	2	53	2	55	2	57	2	59	3	1																			26
27	2	48	2	50	2	52	2	54	2	56	2	57																					27
28	2	47	2	49	2	51	2	53	2	55	2	56																					28
29	2	47	2	48	2	50	2	52	2	54																							29
30	2	47	2	48	2	49	2	51	2	53																							30
31	2	47	2	48	2	49	2	50																									31
32	2	47	2	48	2	49	2	50																									32
33	2	47	2	48	2	49																											33
34	2	48	2	48	2	49																											34
35	2	48	2	48																													35
36	2	49	2	48																													36
37	2	49																															37
38	2	50																															38
39																																	39
40																																	40
41																																	41
42																																	42
43																																	43
44																																	44
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46																																	46
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61																																	61
62																																	62
63																																	63
64																																	64
65																																	65
	32°		34°		36°		38°		40°		42°		44°		46°		48°		50°		52°												

TABLE P. EFFECT OF SUN'S PAR

To be subtracted from the third Correction.

☽'s App. Alt.	Sun's Apparent Altitude.									
	5	10	20	30	40	50	60	65	80	90
	″	″	″	″	″	″	″	″	″	′
5	1	2	2	3	3	4	4	4		
10	2	2	3	4	4	5	5			
15	3	3	4	4	5	5				
20	4	4	4	5	6	6				
25	4	5	5	6	6					
30	5	5	6	7	7					
35	6	6	7	7						
40	7	7	7	8						
45	7	7	8	8						
50	8	8	8							
55	8	9								
60	9	9								
65	9									

Third Correction, to Apparent Distance 116°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																☽'s App Alt.
	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	18°	20°	22°	24°	26°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	2 50	2 52	2 55	2 59	3 4	3 10	3 17	3 25	3 33	3 41	3 49	4 5	4 22	4 39	4 56	5 13	6
7	2 52	2 50	2 52	2 55	2 58	3 2	3 8	3 13	3 19	3 25	3 32	3 46	4 0	4 14	4 28	4 42	7
8	2 56	2 52	2 50	2 52	2 54	2 57	3 1	3 5	3 10	3 15	3 21	3 32	3 44	3 56	4 8	4 20	8
9	3 1	2 55	2 52	2 50	2 52	2 54	2 57	3 0	3 4	3 8	3 13	3 21	3 31	3 42	3 53	4 4	9
10	3 7	2 59	2 55	2 52	2 51	2 52	2 54	2 57	3 0	3 3	3 7	3 14	3 22	3 31	3 41	3 50	10
11	3 13	3 4	2 58	2 54	2 52	2 51	2 53	2 55	2 57	3 0	3 3	3 9	3 16	3 23	3 31	3 39	11
12	3 20	3 9	3 2	2 57	2 54	2 53	2 52	2 53	2 55	2 57	3 0	3 5	3 10	3 16	3 23	3 30	12
13	3 27	3 15	3 6	3 1	2 57	2 55	2 53	2 52	2 53	2 55	2 58	3 2	3 6	3 11	3 17	3 23	13
14	3 35	3 21	3 11	3 5	3 0	2 57	2 55	2 53	2 52	2 54	2 56	2 59	3 3	3 7	3 12	3 18	14
15	3 43	3 27	3 16	3 9	3 4	3 0	2 57	2 55	2 53	2 53	2 54	2 57	3 0	3 4	3 8	3 14	15
16	3 51	3 33	3 21	3 13	3 7	3 3	3 0	2 57	2 55	2 54	2 53	2 55	2 58	3 1	3 5	3 10	16
17	3 59	3 40	3 27	3 17	3 11	3 6	3 2	2 59	2 57	2 55	2 54	2 55	2 57	2 59	3 3	3 7	17
18	4 7	3 47	3 33	3 22	3 14	3 9	3 5	3 1	2 59	2 56	2 55	2 54	2 56	2 58	3 1	3 5	18
19	4 16	3 54	3 39	3 27	3 18	3 12	3 8	3 4	3 1	2 58	2 56	2 55	2 55	2 57	3 0	3 3	19
20	4 24	4 1	3 45	3 32	3 22	3 16	3 11	3 7	3 3	3 0	2 58	2 56	2 55	2 57	2 59	3 2	20
21	4 33	4 8	3 51	3 37	3 27	3 20	3 14	3 9	3 5	3 2	3 0	2 57	2 56	2 57	2 59	3 1	21
22	4 41	4 15	3 57	3 43	3 32	3 24	3 17	3 12	3 7	3 4	3 2	2 59	2 57	2 56	2 58	3 0	22
23	4 49	4 22	4 4	3 49	3 37	3 28	3 21	3 15	3 10	3 7	3 4	3 0	2 58	2 57	2 58	3 0	23
24	4 58	4 29	4 10	3 54	3 42	3 32	3 24	3 18	3 13	3 10	3 7	3 2	2 59	2 58	2 57	2 59	24
25	5 6	4 36	4 16	4 0	3 47	3 37	3 28	3 21	3 16	3 12	3 9	3 4	3 1	2 59	2 58	2 59	25
26	5 15	4 43	4 22	4 5	3 52	3 41	3 32	3 24	3 18	3 14	3 11	3 6	3 2	3 0	2 59	2 58	26
27	5 23	4 50	4 28	4 11	3 57	3 45	3 35	3 27	3 21	3 16	3 13	3 8	3 4	3 2	3 0	2 59	27
28	5 31	4 57	4 34	4 16	4 1	3 49	3 39	3 31	3 24	3 19	3 15	3 9	3 5	3 3	3 1	2 59	28
29	5 39	5 4	4 40	4 21	4 6	3 54	3 43	3 34	3 27	3 21	3 17	3 11	3 7	3 4	3 2	3 0	29
30	5 47	5 11	4 46	4 26	4 10	3 58	3 47	3 38	3 30	3 24	3 19	3 13	3 8	3 5	3 3	3 1	30
31	5 55	5 18	4 52	4 32	4 15	4 2	3 51	3 42	3 34	3 27	3 22	3 15	3 10	3 6	3 4	3 2	31
32	6 3	5 26	4 58	4 37	4 20	4 6	3 55	3 45	3 37	3 30	3 25	3 17	3 12	3 8	3 5	3 3	32
33	6 12	5 33	5 5	4 42	4 25	4 11	3 59	3 48	3 40	3 33	3 27	3 19	3 13	3 9	3 6	3 4	33
34	6 20	5 40	5 11	4 47	4 30	4 15	4 2	3 52	3 43	3 36	3 30	3 21	3 15	3 10	3 7	3 5	34
35	6 29	5 47	5 17	4 53	4 35	4 20	4 6	3 55	3 47	3 40	3 33	3 24	3 17	3 12	3 9	3 6	35
36	6 37	5 55	5 23	4 58	4 40	4 24	4 10	3 59	3 50	3 43	3 36	3 26	3 19	3 14	3 10	3 7	36
37	6 45	6 2	5 29	5 4	4 45	4 29	4 14	4 2	3 53	3 46	3 39	3 29	3 21	3 15	3 11	3 8	37
38	6 53	6 9	5 35	5 9	4 50	4 33	4 18	4 6	3 57	3 49	3 42	3 31	3 23	3 17	3 13	3 9	38
39	7 1	6 16	5 41	5 15	4 54	4 37	4 22	4 10	4 0	3 52	3 45	3 33	3 25	3 19	3 15		39
40	7 8	6 23	5 47	5 20	4 58	4 41	4 26	4 13	4 3	3 54	3 47	3 36	3 27	3 20	3 16		40
41	7 15	6 29	5 53	5 25	5 3	4 45	4 30	4 17	4 6	3 57	3 50	3 39	3 29	3 21			41
42	7 22	6 35	5 58	5 30	5 7	4 49	4 33	4 20	4 9	4 0	3 53	3 41	3 31	3 23			42
43	7 30	6 41	6 4	5 35	5 12	4 53	4 37	4 23	4 12	4 3	3 55	3 43	3 33				43
44	7 37	6 47	6 9	5 40	5 16	4 57	4 41	4 27	4 15	4 6	3 58	3 45	3 34				44
45	7 45	6 53	6 15	5 45	5 21	5 1	4 44	4 30	4 18	4 9	4 1	3 47					45
46	7 52	6 59	6 20	5 49	5 25	5 5	4 48	4 33	4 21	4 11	4 3	3 49					46
47	7 59	7 5	6 25	5 54	5 29	5 9	4 52	4 37	4 24	4 14	4 6						47
48	8 6	7 10	6 30	5 59	5 33	5 13	4 55	4 40	4 27	4 17	4 8						48
49	8 12	7 15	6 35	6 4	5 37	5 16	4 58	4 43	4 30	4 19							49
50	8 18	7 20	6 40	6 8	5 41	5 20	5 1	4 46	4 33								50
51	8 24	7 26	6 45	6 12	5 45	5 23	5 4	4 49									51
52	8 30	7 31	6 50	6 16	5 49	5 27	5 7										52
53	8 36	7 37	6 55	6 20	5 53	5 30											53
54	8 42	7 42	6 59	6 24	5 56												54
55	8 48	7 47	7 3	6 28													55
56	8 54	7 52	7 7														56
57	8 59	7 57															57
58	9 3																58
59																	59
60																	60
61																	61
62																	62
63																	63
64																	64
65																	65
	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	18°	20°	22°	24°	26°	

THIRD CORRECTION to APPARENT DISTANCE 116°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																								☽'s App Alt.
	28°		30°		32°		34°		36°		38°		40°		42°		44°		46°		48°		50°		52°		54°		56°		58°		
°	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	°
6	5	30	5	46	6	3	6	19	6	36	6	52	7	7	7	22	7	36	7	51	8	5	8	18	8	30	8	42	8	53	9	3	6
7	4	56	5	10	5	25	5	40	5	55	6	9	6	22	6	34	6	46	6	58	7	9	7	20	7	31	7	42	7	52			7
8	4	33	4	45	4	58	5	11	5	24	5	36	5	47	5	58	6	8	6	18	6	28	6	38	6	48	6	58	7	8			8
9	4	15	4	26	4	37	4	47	4	58	5	8	5	19	5	29	5	39	5	49	5	59	6	8	6	16	6	24					9
10	4	0	4	10	4	20	4	29	4	39	4	48	4	58	5	7	5	16	5	25	5	33	5	41	5	49	5	56					10
11	3	48	3	57	4	6	4	15	4	23	4	32	4	41	4	49	4	57	5	5	5	12	5	19	5	25							11
12	3	38	3	46	3	54	4	2	4	10	4	18	4	26	4	34	4	41	4	48	4	54	5	1	5	7							12
13	3	30	3	37	3	44	3	52	4	0	4	7	4	14	4	21	4	27	4	33	4	39	4	45									13
14	3	24	3	30	3	37	3	44	3	51	3	57	4	4	4	10	4	16	4	21	4	27	4	33									14
15	3	19	3	25	3	31	3	37	3	43	3	49	3	55	4	1	4	6	4	11	4	17											15
16	3	15	3	20	3	26	3	31	3	37	3	42	3	47	3	53	3	58	4	2	4	8											16
17	3	12	3	16	3	21	3	26	3	31	3	36	3	41	3	46	3	51	3	55													17
18	3	9	3	13	3	17	3	22	3	26	3	31	3	36	3	40	3	45	3	49													18
19	3	7	3	10	3	14	3	18	3	22	3	27	3	31	3	35	3	39															19
20	3	5	3	8	3	11	3	15	3	19	3	23	3	27	3	31	3	34															20
21	3	4	3	6	3	9	3	12	3	16	3	20	3	23	3	27																	21
22	3	3	3	5	3	7	3	10	3	14	3	17	3	20	3	23																	22
23	3	2	3	4	3	6	3	9	3	12	3	15	3	18																			23
24	3	1	3	3	3	5	3	8	3	10	3	13	3	16																			24
25	3	0	3	2	3	4	3	7	3	9	3	11																					25
26	3	0	3	2	3	4	3	6	3	7	3	9																					26
27	3	0	3	1	3	3	3	5	3	6																							27
28	2	59	3	0	3	2	3	4	3	5																							28
29	2	59	3	0	3	1	3	3																									29
30	3	0	3	0	3	1	3	3																									30
31	3	1	3	0	3	1																											31
32	3	2	3	1	3	2																											32
33	3	2	3	1																													33
34	3	3	3	2																													34
35	3	4																															35
36	3	5																															36
37																																	37
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64																																	64
65																																	65
	28°		30°		32°		34°		36°		38°		40°		42°		44°		46°		48°												

TABLE P. EFFECT OF SUN'S PAR

To be subtracted from the third Correction.

☽'s App. Alt.	Sun's Apparent Altitude.								
	5 ″	10 ′	20 ″	30 ″	40 ″	50 ″	60 ″	70 ″	80 ″	90 ″
5	2	2	3	3	4	4	5			
10	2	3	4	4	5	5	6			
15	3	4	5	5	6	6	7			
20	4	5	6	6	7	8				
25	5	6	7	7	8					
30	5	6	7	8	8					
35	6	7	8	8						
40	7	8	8	9						
45	8	8	9							
50	8	9								
55	9	9								
60	9									

Third Correction to Apparent Distance 120°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.																								☽'s App Alt.
	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	22°									
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″									°
6	3 1	3 3	3 6	3 11	3 17	3 24	3 32	3 39	3 47	3 55	4 4	4 12	4 21	4 30	4 39	4 57									6
7	3 3	3 2	3 4	3 7	3 11	3 16	3 22	3 28	3 34	3 40	3 47	3 54	4 1	4 8	4 15	4 30									7
8	3 7	3 4	3 3	3 5	3 8	3 11	3 15	3 20	3 25	3 29	3 35	3 40	3 46	3 52	3 59	4 12									8
9	3 12	3 8	3 5	3 4	3 6	3 8	3 11	3 14	3 18	3 22	3 26	3 31	3 36	3 41	3 47	3 58									9
10	3 18	3 12	3 8	3 6	3 5	3 6	3 8	3 10	3 14	3 17	3 20	3 24	3 28	3 33	3 38	3 47									10
11	3 25	3 17	3 12	3 8	3 6	3 5	3 6	3 8	3 11	3 13	3 16	3 19	3 22	3 26	3 30	3 38									11
12	3 33	3 23	3 16	3 11	3 8	3 6	3 5	3 7	3 9	3 11	3 13	3 15	3 18	3 21	3 24	3 31									12
13	3 41	3 28	3 20	3 15	3 11	3 8	3 6	3 6	3 8	3 9	3 11	3 13	3 15	3 17	3 20	3 26									13
14	3 49	3 34	3 25	3 19	3 14	3 11	3 8	3 7	3 7	3 8	3 9	3 11	3 12	3 14	3 17	3 22									14
15	3 57	3 41	3 30	3 23	3 18	3 14	3 11	3 9	3 8	3 7	3 8	3 9	3 11	3 12	3 14	3 18									15
16	4 6	3 48	3 36	3 28	3 22	3 17	3 13	3 11	3 9	3 8	3 8	3 9	3 10	3 11	3 12	3 16									16
17	4 14	3 55	3 42	3 32	3 25	3 20	3 15	3 12	3 10	3 9	3 9	3 9	3 9	3 10	3 11	3 14									17
18	4 23	4 3	3 48	3 37	3 29	3 23	3 18	3 14	3 12	3 11	3 10	3 9	3 9	3 10	3 11	3 13									18
19	4 32	4 10	3 54	3 42	3 33	3 26	3 21	3 17	3 15	3 13	3 11	3 10	3 10	3 9	3 10	3 12									19
20	4 40	4 17	4 1	3 48	3 38	3 30	3 24	3 20	3 17	3 15	3 13	3 12	3 11	3 10	3 10	3 12									20
21	4 49	4 24	4 7	3 53	3 42	3 34	3 28	3 23	3 19	3 17	3 15	3 13	3 12	3 11	3 10	3 11									21
22	4 58	4 31	4 14	3 58	3 47	3 39	3 32	3 26	3 22	3 19	3 16	3 14	3 13	3 12	3 11	3 11									22
23	5 7	4 39	4 21	4 4	3 52	3 43	3 36	3 30	3 25	3 21	3 18	3 16	3 14	3 13	3 12	3 12									23
24	5 16	4 46	4 27	4 10	3 57	3 47	3 39	3 33	3 28	3 23	3 20	3 18	3 16	3 15	3 14	3 13									24
25	5 25	4 53	4 33	4 15	4 2	3 51	3 43	3 36	3 31	3 26	3 23	3 20	3 18	3 17	3 15	3 14									25
26	5 34	5 1	4 40	4 20	4 7	3 56	3 47	3 39	3 34	3 29	3 25	3 22	3 20	3 18	3 16	3 15									26
27	5 42	5 8	4 47	4 25	4 12	4 1	3 51	3 43	3 37	3 32	3 28	3 25	3 22	3 20	3 18	3 16									27
28	5 51	5 16	4 53	4 31	4 17	4 5	3 55	3 47	3 40	3 35	3 30	3 27	3 24	3 22	3 20	3 17									28
29	6 0	5 24	5 0	4 37	4 22	4 10	3 59	3 50	3 43	3 37	3 33	3 29	3 26	3 23	3 21	3 18									29
30	6 8	5 31	5 6	4 43	4 27	4 15	4 3	3 54	3 46	3 40	3 36	3 32	3 28	3 25	3 23	3 19									30
31	6 17	5 39	5 12	4 48	4 32	4 19	4 7	3 57	3 49	3 43	3 38	3 34	3 30	3 27	3 25	3 20									31
32	6 25	5 46	5 18	4 54	4 37	4 23	4 11	4 1	3 52	3 46	3 41	3 36	3 32	3 29	3 27	3 22									32
33	6 34	5 54	5 25	5 0	4 42	4 27	4 15	4 5	3 56	3 49	3 44	3 39	3 35	3 32	3 29	3 24									33
34	6 43	6 2	5 31	5 6	4 47	4 32	4 19	4 9	3 59	3 52	3 47	3 42	3 37	3 34	3 31	3 26									34
35	6 51	6 9	5 38	5 12	4 52	4 37	4 24	4 12	4 2	3 55	3 50	3 45	3 40	3 36	3 33	3 28									35
36	6 59	6 16	5 44	5 18	4 57	4 42	4 28	4 15	4 5	3 58	3 53	3 47	3 42	3 38	3 35	3 30									36
37	7 8	6 23	5 50	5 23	5 2	4 46	4 32	4 19	4 9	4 2	3 56	3 50	3 45	3 41	3 37	3 31									37
38	7 16	6 30	5 56	5 28	5 7	4 50	4 36	4 23	4 13	4 5	3 59	3 53	3 47	3 43	3 39	3 33									38
39	7 24	6 37	6 2	5 34	5 12	4 55	4 40	4 27	4 16	4 8	4 1	3 55	3 50	3 45	3 41										39
40	7 32	6 44	6 8	5 39	5 17	4 59	4 44	4 31	4 20	4 11	4 4	3 58	3 52	3 47	3 43										40
41	7 40	6 50	6 14	5 44	5 22	5 4	4 48	4 35	4 24	4 15	4 7	4 1	3 55	3 49											41
42	7 47	6 56	6 19	5 50	5 27	5 8	4 52	4 39	4 28	4 18	4 10	4 3	3 57												42
43	7 55	7 2	6 25	5 55	5 32	5 13	4 56	4 42	4 31	4 21	4 13	4 6													43
44	8 3	7 9	6 31	6 0	5 37	5 17	5 0	4 46	4 34	4 24	4 16														44
45	8 11	7 15	6 36	6 5	5 42	5 22	5 4	4 49	4 37	4 27															45
46	8 18	7 21	6 41	6 10	5 46	5 26	5 8	4 53	4 40																46
47	8 25	7 27	6 46	6 15	5 51	5 30	5 11	4 56																	47
48	8 32	7 33	6 52	6 20	5 55	5 34	5 14																		48
49	8 39	7 39	6 57	6 25	5 59	5 37																			49
50	8 45	7 45	7 2	6 30	6 3																				50
51	8 51	7 51	7 8	6 34																					51
52	8 57	7 57	7 13																						52
53	9 3	8 3																							53
54	9 9																								54
55																									55
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64																									64
65																									65
	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°														

TABLE P. EFFECT OF SUN'S PAR.
To be subtracted from the third Correction.

☽'s App. Alt.	Sun's Apparent Altitude.								
	5	10	20	30	40	50	55	70	80	90
	″	″	″	″	″	″	″	″	″	″
5	2	2	3	3	4	5	5			
10	2	3	3	4	5	6				
15	3	4	4	5	6	7				
20	4	4	5	6	7					
25	5	5	6	7	7					
30	6	6	7	8						
35	6	7	8							
40	7	8	8							
45	8	8								
50	8	9								
55	9									

TABLE XVIII.

THIRD CORRECTION, to APPARENT DISTANCE 120°.

☽'s App Alt.	APPARENT ALTITUDE OF THE SUN, OR STAR.															☽'s App Alt.
	24°	26°	28°	30°	32°	34°	36°	38°	40°	42°	44°	46°	48°	50°	52°	54°	
°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	°
6	5 15	5 32	5 49	6 6	6 23	6 41	6 58	7 14	7 30	7 46	8 2	8 17	8 31	8 44	8 57	9 9	6
7	4 45	5 0	5 15	5 30	5 45	6 0	6 15	6 29	6 43	6 56	7 8	7 21	7 33	7 45	7 57		7
8	4 25	4 38	4 51	5 4	5 17	5 30	5 43	5 56	6 8	6 20	6 31	6 42	6 53	7 3	7 13		8
9	4 9	4 20	4 31	4 43	4 55	5 7	5 18	5 28	5 38	5 49	6 0	6 10	6 20	6 29			9
10	3 57	4 7	4 17	4 27	4 37	4 47	4 57	5 7	5 17	5 27	5 37	5 46	5 55	6 3			10
11	3 47	3 56	4 5	4 14	4 23	4 32	4 42	4 51	4 59	5 8	5 17	5 25	5 33				11
12	3 39	3 47	3 55	4 3	4 11	4 19	4 28	4 36	4 44	4 52	5 0	5 7	5 14				12
13	3 32	3 39	3 46	3 53	4 0	4 8	4 16	4 24	4 31	4 38	4 46	4 53					13
14	3 27	3 33	3 39	3 46	3 52	3 59	4 6	4 13	4 20	4 27	4 34	4 40					14
15	3 23	3 29	3 34	3 40	3 46	3 52	3 58	4 4	4 11	4 18	4 24						15
16	3 20	3 25	3 30	3 36	3 41	3 46	3 52	3 58	4 4	4 10	4 16						16
17	3 18	3 22	3 27	3 32	3 36	3 41	3 47	3 52	3 58	4 3							17
18	3 16	3 20	3 24	3 28	3 32	3 37	3 42	3 47	3 52	3 57							18
19	3 15	3 18	3 21	3 25	3 29	3 33	3 38	3 43	3 47								19
20	3 14	3 16	3 19	3 23	3 27	3 31	3 35	3 39	3 43								20
21	3 13	3 15	3 17	3 21	3 24	3 28	3 32	3 36									21
22	3 12	3 14	3 16	3 19	3 22	3 26	3 29	3 33									22
23	3 12	3 13	3 15	3 18	3 21	3 24	3 27										23
24	3 12	3 13	3 15	3 17	3 20	3 23	3 26										24
25	3 12	3 13	3 15	3 17	3 19	3 21											25
26	3 13	3 14	3 15	3 16	3 18	3 20											26
27	3 14	3 14	3 15	3 16	3 18												27
28	3 15	3 14	3 15	3 16	3 18												28
29	3 16	3 15	3 15	3 16													29
30	3 17	3 16	3 16	3 16													30
31	3 18	3 17	3 17														31
32	3 19	3 18	3 18														32
33	3 21	3 19															33
34	3 22	3 20															34
35	3 24																35
36	3 26																36
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63																	63
64																	64
65																	65
	24°	26°	28°	30°	32°	34°	36°	38°	40°	42°	44°	46°	48°	50°	52°.	54°	

TABLE XIX.

Proportional Logarithms.

″ s.	○ / h. m. 0 0	○ / h. m. 0 1	○ / h. m. 0 2	○ / h. m. 0 3	○ / h. m. 0 4	○ / h. m. 0 5	○ / h. m. 0 6	○ / h. m. 0 7	○ / h. m. 0 8	○ / h. m. 0 9	″ s.
0		2.2553	1.9542	1.7782	1.6532	1.5563	1.4771	1.4102	1.3522	1.3010	0
1	4.0334	2.2481	1.9506	1.7757	1.6514	1.5549	1.4759	1.4091	1.3513	1.3002	1
2	3.7324	2.2410	1.9471	1.7734	1.6496	1.5534	1.4747	1.4081	1.3504	1.2994	2
3	3.5563	2.2341	1.9435	1.7710	1.6478	1.5520	1.4735	1.4071	1.3495	1.2986	3
4	3.4314	2.2272	1.9400	1.7686	1.6460	1.5506	1.4723	1.4061	1.3486	1.2978	4
5	3.3345	2.2205	1.9365	1.7663	1.6443	1.5491	1.4711	1.4050	1.3477	1.2970	5
6	3.2553	2.2139	1.9331	1.7639	1.6425	1.5477	1.4699	1.4040	1.3468	1.2962	6
7	3.1883	2.2073	1.9296	1.7616	1.6407	1.5463	1.4688	1.4030	1.3459	1.2954	7
8	3.1303	2.2009	1.9262	1.7593	1.6390	1.5449	1.4676	1.4020	1.3450	1.2946	8
9	3.0792	2.1946	1.9228	1.7570	1.6372	1.5435	1.4664	1.4010	1.3441	1.2939	9
10	3.0334	2.1883	1.9195	1.7547	1.6355	1.5421	1.4652	1.4000	1.3432	1.2931	10
11	2.9920	2.1822	1.9162	1.7524	1.6338	1.5407	1.4640	1.3989	1.3423	1.2923	11
12	2.9542	2.1761	1.9128	1.7501	1.6320	1.5393	1.4629	1.3979	1.3415	1.2915	12
13	2.9195	2.1701	1.9096	1.7479	1.6303	1.5379	1.4617	1.3969	1.3406	1.2907	13
14	2.8873	2.1642	1.9063	1.7456	1.6286	1.5365	1.4606	1.3959	1.3397	1.2899	14
15	2.8573	2.1584	1.9031	1.7434	1.6269	1.5351	1.4594	1.3949	1.3388	1.2891	15
16	2.8293	2.1526	1.8999	1.7412	1.6252	1.5337	1.4582	1.3939	1.3379	1.2883	16
17	2.8030	2.1469	1.8967	1.7390	1.6235	1.5324	1.4571	1.3929	1.3371	1.2876	17
18	2.7782	2.1413	1.8935	1.7368	1.6218	1.5310	1.4559	1.3919	1.3362	1.2868	18
19	2.7547	2.1358	1.8904	1.7346	1.6201	1.5296	1.4548	1.3910	1.3353	1.2860	19
20	2.7324	2.1303	1.8873	1.7324	1.6185	1.5283	1.4536	1.3900	1.3345	1.2852	20
21	2.7112	2.1249	1.8842	1.7302	1.6168	1.5269	1.4525	1.3890	1.3336	1.2845	21
22	2.6910	2.1196	1.8811	1.7281	1.6151	1.5256	1.4514	1.3880	1.3327	1.2837	22
23	2.6717	2.1143	1.8781	1.7259	1.6135	1.5242	1.4502	1.3870	1.3319	1.2829	23
24	2.6532	2.1091	1.8751	1.7238	1.6118	1.5229	1.4491	1.3860	1.3310	1.2821	24
25	2.6355	2.1040	1.8721	1.7217	1.6102	1.5215	1.4480	1.3851	1.3301	1.2814	25
26	2.6185	2.0989	1.8691	1.7196	1.6085	1.5202	1.4468	1.3841	1.3293	1.2806	26
27	2.6021	2.0939	1.8661	1.7175	1.6069	1.5189	1.4457	1.3831	1.3284	1.2798	27
28	2.5863	2.0889	1.8632	1.7154	1.6053	1.5175	1.4446	1.3821	1.3276	1.2791	28
29	2.5710	2.0840	1.8602	1.7133	1.6037	1.5162	1.4435	1.3812	1.3267	1.2783	29
30	2.5563	2.0792	1.8573	1.7112	1.6021	1.5149	1.4424	1.3802	1.3259	1.2775	30
31	2.5421	2.0744	1.8544	1.7091	1.6005	1.5136	1.4412	1.3792	1.3250	1.2768	31
32	2.5283	2.0696	1.8516	1.7071	1.5989	1.5123	1.4401	1.3783	1.3242	1.2760	32
33	2.5149	2.0649	1.8487	1.7050	1.5973	1.5110	1.4390	1.3773	1.3233	1.2753	33
34	2.5019	2.0603	1.8459	1.7030	1.5957	1.5097	1.4379	1.3764	1.3225	1.2745	34
35	2.4894	2.0557	1.8431	1.7010	1.5941	1.5084	1.4368	1.3754	1.3216	1.2738	35
36	2.4771	2.0512	1.8403	1.6990	1.5925	1.5071	1.4357	1.3745	1.3208	1.2730	36
37	2.4652	2.0467	1.8375	1.6970	1.5909	1.5058	1.4346	1.3735	1.3199	1.2722	37
38	2.4536	2.0422	1.8348	1.6950	1.5894	1.5045	1.4335	1.3726	1.3191	1.2715	38
39	2.4424	2.0378	1.8320	1.6930	1.5878	1.5032	1.4325	1.3716	1.3183	1.2707	39
40	2.4314	2.0334	1.8293	1.6910	1.5863	1.5019	1.4314	1.3707	1.3174	1.2700	40
41	2.4206	2.0291	1.8266	1.6890	1.5847	1.5007	1.4303	1.3697	1.3166	1.2692	41
42	2.4102	2.0248	1.8239	1.6871	1.5832	1.4994	1.4292	1.3688	1.3158	1.2685	42
43	2.4000	2.0206	1.8212	1.6851	1.5816	1.4981	1.4281	1.3678	1.3149	1.2678	43
44	2.3900	2.0164	1.8186	1.6832	1.5801	1.4969	1.4270	1.3669	1.3141	1.2670	44
45	2.3802	2.0122	1.8159	1.6812	1.5786	1.4956	1.4260	1.3660	1.3133	1.2663	45
46	2.3707	2.0081	1.8133	1.6793	1.5771	1.4943	1.4249	1.3650	1.3124	1.2655	46
47	2.3613	2.0040	1.8107	1.6774	1.5755	1.4931	1.4238	1.3641	1.3116	1.2648	47
48	2.3522	2.0000	1.8081	1.6755	1.5740	1.4918	1.4228	1.3632	1.3108	1.2640	48
49	2.3432	1.9960	1.8055	1.6736	1.5725	1.4906	1.4217	1.3623	1.3100	1.2633	49
50	2.3345	1.9920	1.8030	1.6717	1.5710	1.4894	1.4206	1.3613	1.3091	1.2626	50
51	2.3259	1.9881	1.8004	1.6698	1.5695	1.4881	1.4196	1.3604	1.3083	1.2618	51
52	2.3174	1.9842	1.7979	1.6679	1.5680	1.4869	1.4185	1.3595	1.3075	1.2611	52
53	2.3091	1.9803	1.7954	1.6661	1.5666	1.4856	1.4175	1.3586	1.3067	1.2604	53
54	2.3010	1.9765	1.7929	1.6642	1.5651	1.4844	1.4164	1.3576	1.3059	1.2596	54
55	2.2931	1.9727	1.7904	1.6624	1.5636	1.4832	1.4154	1.3567	1.3051	1.2589	55
56	2.2852	1.9690	1.7879	1.6605	1.5621	1.4820	1.4143	1.3558	1.3043	1.2582	56
57	2.2775	1.9652	1.7855	1.6587	1.5607	1.4808	1.4133	1.3549	1.3034	1.2574	57
58	2.2700	1.9615	1.7830	1.6568	1.5592	1.4795	1.4122	1.3540	1.3026	1.2567	58
59	2.2626	1.9579	1.7806	1.6550	1.5578	1.4783	1.4112	1.3531	1.3018	1.2560	59
	0 0	1 0	2 0	3 0	4 0	5 0	6 0	7 0	8 0	9	

Proportional Logarithms.

" s.	° ′ h. m. 0 10	° ′ h. m. 0 11	° ′ h. m. 0 12	° ′ h. m. 0 13	° ′ h. m. 0 14	° ′ h. m. 0 15	° ′ h. m. 0 16	° ′ h. m. 0 17	° ′ h. m. 0 18	° ′ h. m. 0 19	" s.
0	1.2553	1.2139	1.1761	1.1413	1.1091	1.0792	1.0512	1.0248	1.0000	0.9765	0
1	1.2545	1.2132	1.1755	1.1408	1.1086	1.0787	1.0507	1.0244	0.9996	0.9761	1
2	1.2538	1.2126	1.1749	1.1402	1.1081	1.0782	1.0502	1.0240	0.9992	0.9758	2
3	1.2531	1.2119	1.1743	1.1397	1.1076	1.0777	1.0498	1.0235	0.9988	0.9754	3
4	1.2524	1.2113	1.1737	1.1391	1.1071	1.0773	1.0493	1.0231	0.9984	0.9750	4
5	1.2517	1.2106	1.1731	1.1386	1.1066	1.0768	1.0489	1.0227	0.9980	0.9746	5
6	1.2510	1.2099	1.1725	1.1380	1.1061	1.0763	1.0484	1.0223	0.9976	0.9742	6
7	1.2502	1.2093	1.1719	1.1374	1.1055	1.0758	1.0480	1.0219	0.9972	0.9739	7
8	1.2495	1.2086	1.1713	1.1369	1.1050	1.0753	1.0475	1.0214	0.9968	0.9735	8
9	1.2488	1.2080	1.1707	1.1363	1.1045	1.0749	1.0471	1.0210	0.9964	0.9731	9
10	1.2481	1.2073	1.1701	1.1358	1.1040	1.0744	1.0467	1.0206	0.9960	0.9727	10
11	1.2474	1.2067	1.1695	1.1352	1.1035	1.0739	1.0462	1.0202	0.9956	0.9723	11
12	1.2467	1.2061	1.1689	1.1347	1.1030	1.0734	1.0458	1.0197	0.9952	0.9720	12
13	1.2460	1.2054	1.1683	1.1342	1.1025	1.0730	1.0453	1.0193	0.9948	0.9716	13
14	1.2453	1.2048	1.1677	1.1336	1.1020	1.0725	1.0449	1.0189	0.9944	0.9712	14
15	1.2445	1.2041	1.1671	1.1331	1.1015	1.0720	1.0444	1.0185	0.9940	0.9708	15
16	1.2438	1.2035	1.1665	1.1325	1.1009	1.0715	1.0440	1.0181	0.9936	0.9705	16
17	1.2431	1.2028	1.1660	1.1320	1.1004	1.0711	1.0435	1.0176	0.9932	0.9701	17
18	1.2424	1.2022	1.1654	1.1314	1.0999	1.0706	1.0431	1.0172	0.9928	0.9697	18
19	1.2417	1.2016	1.1648	1.1309	1.0994	1.0701	1.0426	1.0168	0.9924	0.9693	19
20	1.2410	1.2009	1.1642	1.1303	1.0989	1.0696	1.0422	1.0164	0.9920	0.9690	20
21	1.2403	1.2003	1.1636	1.1298	1.0984	1.0692	1.0418	1.0160	0.9916	0.9686	21
22	1.2396	1.1996	1.1630	1.1292	1.0979	1.0687	1.0413	1.0156	0.9912	0.9682	22
23	1.2389	1.1990	1.1624	1.1287	1.0974	1.0682	1.0409	1.0151	0.9908	0.9678	23
24	1.2382	1.1984	1.1619	1.1282	1.0969	1.0678	1.0404	1.0147	0.9905	0.9675	24
25	1.2375	1.1977	1.1613	1.1276	1.0964	1.0673	1.0400	1.0143	0.9901	0.9671	25
26	1.2368	1.1971	1.1607	1.1271	1.0959	1.0668	1.0395	1.0139	0.9897	0.9667	26
27	1.2362	1.1965	1.1601	1.1266	1.0954	1.0663	1.0391	1.0135	0.9893	0.9664	27
28	1.2355	1.1958	1.1595	1.1260	1.0949	1.0659	1.0387	1.0131	0.9889	0.9660	28
29	1.2348	1.1952	1.1589	1.1255	1.0944	1.0654	1.0382	1.0126	0.9885	0.9656	29
30	1.2341	1.1946	1.1584	1.1249	1.0939	1.0649	1.0378	1.0122	0.9881	0.9652	30
31	1.2334	1.1939	1.1578	1.1244	1.0934	1.0645	1.0374	1.0118	0.9877	0.9649	31
32	1.2327	1.1933	1.1572	1.1239	1.0929	1.0640	1.0369	1.0114	0.9873	0.9645	32
33	1.2320	1.1927	1.1566	1.1233	1.0924	1.0635	1.0365	1.0110	0.9869	0.9641	33
34	1.2313	1.1921	1.1561	1.1228	1.0919	1.0631	1.0360	1.0106	0.9865	0.9638	34
35	1.2307	1.1914	1.1555	1.1223	1.0914	1.0626	1.0356	1.0102	0.9861	0.9634	35
36	1.2300	1.1908	1.1549	1.1217	1.0909	1.0621	1.0352	1.0098	0.9858	0.9630	36
37	1.2293	1.1902	1.1543	1.1212	1.0904	1.0617	1.0347	1.0093	0.9854	0.9626	37
38	1.2286	1.1896	1.1538	1.1207	1.0899	1.0612	1.0343	1.0089	0.9850	0.9623	38
39	1.2279	1.1889	1.1532	1.1201	1.0894	1.0608	1.0339	1.0085	0.9846	0.9619	39
40	1.2272	1.1883	1.1526	1.1196	1.0889	1.0603	1.0334	1.0081	0.9842	0.9615	40
41	1.2266	1.1877	1.1520	1.1191	1.0884	1.0598	1.0330	1.0077	0.9838	0.9612	41
42	1.2259	1.1871	1.1515	1.1186	1.0880	1.0594	1.0326	1.0073	0.9834	0.9608	42
43	1.2252	1.1865	1.1509	1.1180	1.0875	1.0589	1.0321	1.0069	0.9830	0.9604	43
44	1.2245	1.1859	1.1503	1.1175	1.0870	1.0585	1.0317	1.0065	0.9827	0.9601	44
45	1.2239	1.1852	1.1498	1.1170	1.0865	1.0580	1.0313	1.0061	0.9823	0.9597	45
46	1.2232	1.1846	1.1492	1.1164	1.0860	1.0575	1.0308	1.0057	0.9819	0.9593	46
47	1.2225	1.1840	1.1486	1.1159	1.0855	1.0571	1.0304	1.0053	0.9815	0.9590	47
48	1.2218	1.1834	1.1481	1.1154	1.0850	1.0566	1.0300	1.0049	0.9811	0.9586	48
49	1.2212	1.1828	1.1475	1.1149	1.0845	1.0562	1.0295	1.0044	0.9807	0.9582	49
50	1.2205	1.1822	1.1469	1.1143	1.0840	1.0557	1.0291	1.0040	0.9803	0.9579	50
51	1.2198	1.1816	1.1464	1.1138	1.0835	1.0552	1.0287	1.0036	0.9800	0.9575	51
52	1.2192	1.1809	1.1458	1.1133	1.0831	1.0548	1.0282	1.0032	0.9796	0.9571	52
53	1.2185	1.1803	1.1452	1.1128	1.0826	1.0543	1.0278	1.0028	0.9792	0.9568	53
54	1.2178	1.1797	1.1447	1.1123	1.0821	1.0539	1.0274	1.0024	0.9788	0.9564	54
55	1.2172	1.1791	1.1441	1.1117	1.0816	1.0534	1.0270	1.0020	0.9784	0.9561	55
56	1.2165	1.1785	1.1436	1.1112	1.0811	1.0530	1.0265	1.0016	0.9780	0.9557	56
57	1.2159	1.1779	1.1430	1.1107	1.0806	1.0525	1.0261	1.0012	0.9777	0.9553	57
58	1.2152	1.1773	1.1424	1.1102	1.0801	1.0521	1.0257	1.0008	0.9773	0.9550	58
59	1.2145	1.1767	1.1419	1.1097	1.0797	1.0516	1.0252	1.0004	0.9769	0.9546	59
	0 10	0 11	0 12	0 13	0 14	0 15	0 16	0 17	0 18	0 19	

Proportional Logarithms

" s.	° ′ h m 0 20	° ′ h. m. 0 21	° ′ h. m. 0 22	° ′ h. m. 0 23	° ′ h. m. 0 24	° ′ h. m. 0 25	° ′ h. m. 0 26	° ′ h. m. 0 27	° ′ h. m. 0 28	° ′ h. m. 0 29	° ′ h. m. 0 30	° ′ h. m. 0 31	" s.
0	0.9542	9331	9128	8935	8751	8573	8403	8239	8081	7929	7782	7639	0
1	9539	9327	9125	8932	8748	8570	8400	8236	8079	7926	7779	7637	1
2	9535	9324	9122	8929	8745	8568	8397	8234	8076	7924	7777	7634	2
3	9532	9320	9119	8926	8742	8565	8395	8231	8073	7921	7774	7632	3
4	9528	9317	9115	8923	8739	8562	8392	8228	8071	7919	7772	7630	4
5	0.9524	9313	9112	8920	8736	8559	8389	8226	8068	7916	7769	7627	5
6	9521	9310	9109	8917	8733	8556	8386	8223	8066	7914	7767	7625	6
7	9517	9306	9106	8913	8730	8553	8384	8220	8063	7911	7765	7623	7
8	9514	9303	9102	8910	8727	8550	8381	8218	8061	7909	7762	7620	8
9	9510	9300	9099	8907	8724	8547	8378	8215	8058	7906	7760	7618	9
10	0.9506	9296	9096	8904	8721	8544	8375	8212	8055	7904	7757	7616	10
11	9503	9293	9092	8901	8718	8542	8372	8210	8053	7901	7755	7613	11
12	9499	9289	9089	8898	8715	8539	8370	8207	8050	7899	7753	7611	12
13	9496	9286	9086	8895	8712	8536	8367	8204	8048	7896	7750	7609	13
14	9492	9283	9083	8892	8709	8533	8364	8202	8045	7894	7748	7607	14
15	0.9488	9279	9079	8888	8706	8530	8361	8199	8043	7891	7745	7604	15
16	9485	9276	9076	8885	8703	8527	8359	8196	8040	7889	7743	7602	16
17	9481	9272	9073	8882	8700	8524	8356	8194	8037	7887	7741	7600	17
18	9478	9269	9070	8879	8697	8522	8353	8191	8035	7884	7738	7597	18
19	9474	9266	9066	8876	8694	8519	8350	8188	8032	7882	7736	7595	19
20	0.9471	9262	9063	8873	8691	8516	8348	8186	8030	7879	7734	7593	20
21	9467	9259	9060	8870	8688	8513	8345	8183	8027	7877	7731	7590	21
22	9464	9255	9057	8867	8685	8510	8342	8181	8025	7874	7729	7588	22
23	9460	9252	9053	8864	8682	8507	8339	8178	8022	7872	7726	7586	23
24	9456	9249	9050	8861	8679	8504	8337	8175	8020	7869	7724	7583	24
25	0.9453	9245	9047	8857	8676	8502	8334	8173	8017	7867	7722	7581	25
26	9449	9242	9044	8854	8673	8499	8331	8170	8014	7864	7719	7579	26
27	9446	9238	9041	8851	8670	8496	8328	8167	8012	7862	7717	7577	27
28	9442	9235	9037	8848	8667	8493	8326	8165	8009	7859	7714	7574	28
29	9439	9232	9034	8845	8664	8490	8323	8162	8007	7857	7712	7572	29
30	0.9435	9228	9031	8842	8661	8487	8320	8159	8004	7855	7710	7570	30
31	9432	9225	9028	8839	8658	8484	8318	8157	8002	7852	7707	7567	31
32	9428	9222	9024	8836	8655	8482	8315	8154	7999	7850	7705	7565	32
33	9425	9218	9021	8833	8652	8479	8312	8152	7997	7847	7703	7563	33
34	9421	9215	9018	8830	8649	8476	8309	8149	7994	7845	7700	7560	34
35	0.9418	9212	9015	8827	8646	8473	8307	8146	7992	7842	7698	7558	35
36	9414	9208	9012	8824	8643	8470	8304	8144	7989	7840	7696	7556	36
37	9411	9205	9008	8821	8640	8467	8301	8141	7987	7837	7693	7554	37
38	9407	9201	9005	8817	8637	8465	8298	8138	7984	7835	7691	7551	38
39	9404	9198	9002	8814	8635	8462	8296	8136	7981	7832	7688	7549	39
40	0.9400	9195	8999	8811	8632	8459	8293	8133	7979	7830	7686	7547	40
41	9397	9191	8996	8808	8629	8456	8290	8131	7976	7828	7684	7544	41
42	9393	9188	8992	8805	8626	8453	8288	8128	7974	7825	7681	7542	42
43	9390	9185	8989	8802	8623	8451	8285	8125	7971	7823	7679	7540	43
44	9386	9181	8986	8799	8620	8448	8282	8123	7969	7820	7677	7538	44
45	0.9383	9178	8983	8796	8617	8445	8279	8120	7966	7818	7674	7535	45
46	9379	9175	8980	8793	8614	8442	8277	8117	7964	7815	7672	7533	46
47	9376	9172	8977	8790	8611	8439	8274	8115	7961	7813	7670	7531	47
48	9372	9168	8973	8787	8608	8437	8271	8112	7959	7811	7667	7528	48
49	9369	9165	8970	8784	8605	8434	8269	8110	7956	7808	7665	7526	49
50	0.9365	9162	8967	8781	8602	8431	8266	8107	7954	7806	7663	7524	50
51	9362	9158	8964	8778	8599	8428	8263	8104	7951	7803	7660	7522	51
52	9358	9155	8961	8775	8597	8425	8261	8102	7949	7801	7658	7519	52
53	9355	9152	8958	8772	8594	8423	8258	8099	7946	7798	7655	7517	53
54	9351	9148	8954	8769	8591	8420	8255	8097	7944	7796	7653	7515	54
55	0.9348	9145	8951	8766	8588	8417	8253	8094	7941	7794	7651	7513	55
56	9344	9142	8948	8763	8585	8414	8250	8091	7939	7791	7648	7510	56
57	9341	9138	8945	8760	8582	8411	8247	8089	7936	7789	7646	7508	57
58	9337	9135	8942	8757	8579	8409	8244	8086	7934	7786	7644	7506	58
59	9334	9132	8939	8754	8576	8406	8242	8084	7931	7784	7641	7503	59
	0 20	0 21	0 22	0 23	0 24	0 25	0 26	0 27	0 28	0 29	0 30	0 31	

Proportional Logarithms.

" s.	° ′ h. m. 0 32	h. m. 0 33	h. m. 0 34	h. m. 0 35	h. m. 0 36	h. m. 0 37	h. m. 0 38	h. m. 0 39	h. m. 0 40	h. m. 0 41	h. m. 0 42	h. m. 0 43	" s.
0	0.7501	7368	7238	7112	6990	6871	6755	6642	6532	6425	6320	6218	0
1	7499	7365	7236	7110	6988	6869	6753	6640	6530	6423	6319	6216	1
2	7497	7363	7234	7108	6986	6867	6751	6638	6529	6421	6317	6215	2
3	7494	7361	7232	7106	6984	6865	6749	6637	6527	6420	6315	6213	3
4	7492	7359	7229	7104	6982	6863	6747	6635	6525	6418	6313	6211	4
5	0.7490	7357	7227	7102	6980	6861	6745	6633	6523	6416	6312	6210	5
6	7488	7354	7225	7100	6978	6859	6743	6631	6521	6414	6310	6208	6
7	7485	7352	7223	7098	6976	6857	6742	6629	6519	6413	6308	6206	7
8	7483	7350	7221	7096	6974	6855	6740	6627	6518	6411	6306	6205	8
9	7481	7348	7219	7093	6972	6853	6738	6625	6516	6409	6305	6203	9
10	0.7479	7346	7217	7091	6970	6851	6736	6624	6514	6407	6303	6201	10
11	7476	7344	7215	7089	6968	6849	6734	6622	6512	6406	6301	6200	11
12	7474	7341	7212	7087	6966	6847	6732	6620	6510	6404	6300	6198	12
13	7472	7339	7210	7085	6964	6845	6730	6618	6509	6402	6298	6196	13
14	7470	7337	7208	7083	6962	6843	6728	6616	6507	6400	6296	6195	14
15	0.7467	7335	7206	7081	6960	6841	6726	6614	6505	6398	6294	6193	15
16	7465	7333	7204	7079	6958	6840	6725	6612	6503	6397	6293	6191	16
17	7463	7330	7202	7077	6956	6838	6723	6611	6501	6395	6291	6190	17
18	7461	7328	7200	7075	6954	6836	6721	6609	6500	6393	6289	6188	18
19	7458	7326	7198	7073	6952	6834	6719	6607	6498	6391	6288	6186	19
20	0.7456	7324	7196	7071	6950	6832	6717	6605	6496	6390	6286	6185	20
21	7454	7322	7193	7069	6948	6830	6715	6603	6494	6388	6284	6183	21
22	7452	7320	7191	7067	6946	6828	6713	6601	6492	6386	6282	6181	22
23	7450	7317	7189	7065	6944	6826	6711	6600	6491	6384	6281	6179	23
24	7447	7315	7187	7063	6942	6824	6709	6598	6489	6383	6279	6178	24
25	0.7445	7313	7185	7061	6940	6822	6708	6596	6487	6381	6277	6176	25
26	7443	7311	7183	7059	6938	6820	6706	6594	6485	6379	6276	6174	26
27	7441	7309	7181	7057	6936	6818	6704	6592	6484	6377	6274	6173	27
28	7438	7307	7179	7055	6934	6816	6702	6590	6482	6376	6272	6171	28
29	7436	7304	7177	7052	6932	6814	6700	6589	6480	6374	6271	6169	29
30	0.7434	7302	7175	7050	6930	6812	6698	6587	6478	6372	6269	6168	30
31	7432	7300	7172	7048	6928	6810	6696	6585	6476	6371	6267	6166	31
32	7429	7298	7170	7046	6926	6809	6694	6583	6475	6369	6265	6165	32
33	7427	7296	7168	7044	6924	6807	6692	6581	6473	6367	6264	6163	33
34	7425	7294	7166	7042	6922	6805	6691	6579	6471	6365	6262	6161	34
35	0.7423	7291	7164	7040	6920	6803	6689	6578	6469	6364	6260	6160	35
36	7421	7289	7162	7038	6918	6801	6687	6576	6467	6362	6259	6158	36
37	7418	7287	7160	7036	6916	6799	6685	6574	6466	6360	6257	6156	37
38	7416	7285	7158	7034	6914	6797	6683	6572	6464	6358	6255	6155	38
39	7414	7283	7156	7032	6912	6795	6681	6570	6462	6357	6254	6153	39
40	0.7412	7281	7154	7030	6910	6793	6679	6568	6460	6355	6252	6151	40
41	7409	7279	7152	7028	6908	6791	6677	6567	6459	6353	6250	6150	41
42	7407	7276	7149	7026	6906	6789	6676	6565	6457	6351	6248	6148	42
43	7405	7274	7147	7024	6904	6787	6674	6563	6455	6350	6247	6146	43
44	7403	7272	7145	7022	6902	6785	6672	6561	6453	6348	6245	6145	44
45	0.7401	7270	7143	7020	6900	6784	6670	6559	6451	6346	6243	6143	45
46	7398	7268	7141	7018	6898	6782	6668	6558	6450	6344	6242	6141	46
47	7396	7266	7139	7016	6896	6780	6666	6556	6448	6343	6240	6140	47
48	7394	7264	7137	7014	6894	6778	6664	6554	6446	6341	6238	6138	48
49	7392	7261	7135	7012	6892	6776	6663	6552	6444	6339	6237	6136	49
50	0.7390	7259	7133	7010	6890	6774	6661	6550	6443	6338	6235	6135	50
51	7387	7257	7131	7008	6888	6772	6659	6548	6441	6336	6233	6133	51
52	7385	7255	7129	7006	6886	6770	6657	6547	6439	6334	6232	6131	52
53	7383	7253	7127	7004	6884	6768	6655	6545	6437	6332	6230	6130	53
54	7381	7251	7124	7002	6882	6766	6653	6543	6435	6331	6228	6128	54
55	0.7379	7249	7122	7000	6881	6764	6651	6541	6434	6329	6226	6126	55
56	7376	7246	7120	6998	6879	6763	6650	6539	6432	6327	6225	6125	56
57	7374	7244	7118	6996	6877	6761	6648	6538	6430	6325	6223	6123	57
58	7372	7242	7116	6994	6875	6759	6646	6536	6428	6324	6221	6121	58
59	7370	7240	7114	6992	6873	6757	6644	6534	6427	6322	6220	6120	59
	0 32	0 33	0 34	0 35	0 36	0 37	0 38	0 39	0 40	0 41	0 42	0 43	

Proportional Logarithms.

" s.	0 h. 0	1 m. 44	0 h. 0	1 m. 45	0 h. 0	1 m. 46	0 h. 0	1 m. 47	0 h. 0	1 m. 48	0 h. 0	1 m. 49	0 h. 0	1 m. 50	0 h. 0	1 m. 51	0 h. 0	1 m. 52	0 h. 0	1 m. 53	0 h. 0	1 m. 54	0 h. 0	1 m. 55	" s.
0	0.6118		6021		5925		5832		5740		5651		5563		5477		5393		5310		5229		5149		0
1		6117		6019		5924		5830		5739		5649		5562		5476		5391		5309		5227		5148	1
2		6115		6017		5922		5829		5737		5648		5560		5474		5390		5307		5226		5146	2
3		6113		6016		5920		5827		5736		5646		5559		5473		5389		5306		5225		5145	3
4		6112		6014		5919		5826		5734		5645		5557		5471		5387		5305		5223		5144	4
5	0.6110		6013		5917		5824		5733		5643		5556		5470		5386		5303		5222		5143		5
6		6108		6011		5916		5823		5731		5642		5554		5469		5384		5302		5221		5141	6
7		6107		6009		5914		5821		5730		5640		5553		5467		5383		5300		5219		5140	7
8		6105		6008		5913		5819		5728		5639		5551		5466		5382		5299		5218		5139	8
9		6103		6006		5911		5818		5727		5637		5550		5464		5380		5298		5217		5137	9
10	0.6102		6005		5909		5816		5725		5636		5549		5463		5379		5296		5215		5136		10
11		6100		6003		5908		5815		5724		5635		5547		5461		5377		5295		5214		5135	11
12		6099		6001		5906		5813		5722		5633		5546		5460		5376		5294		5213		5133	12
13		6097		6000		5905		5812		5721		5632		5544		5459		5375		5292		5211		5132	13
14		6095		5998		5903		5810		5719		5630		5543		5457		5373		5291		5210		5131	14
15	0.6094		5997		5902		5809		5718		5629		5541		5456		5372		5290		5209		5129		15
16		6092		5995		5900		5807		5716		5627		5540		5454		5370		5288		5207		5128	16
17		6090		5993		5898		5806		5715		5626		5538		5453		5369		5287		5206		5127	17
18		6089		5992		5897		5804		5713		5624		5537		5452		5368		5285		5205		5125	18
19		6087		5990		5895		5803		5712		5623		5536		5450		5366		5284		5203		5124	19
20	0.6085		5989		5894		5801		5710		5621		5534		5449		5365		5283		5202		5123		20
21		6084		5987		5892		5800		5709		5620		5533		5447		5364		5281		5201		5122	21
22		6082		5985		5891		5798		5707		5618		5531		5446		5362		5280		5199		5120	22
23		6081		5984		5889		5796		5706		5617		5530		5445		5361		5279		5198		5119	23
24		6079		5982		5888		5795		5704		5615		5528		5443		5359		5277		5197		5118	24
25	0.6077		5981		5886		5793		5703		5614		5527		5442		5358		5276		5195		5116		25
26		6076		5979		5884		5792		5701		5613		5526		5440		5357		5275		5194		5115	26
27		6074		5977		5883		5790		5700		5611		5524		5439		5355		5273		5193		5114	27
28		6072		5976		5881		5789		5698		5610		5522		5437		5354		5272		5191		5112	28
29		6071		5974		5880		5787		5697		5608		5521		5436		5353		5271		5190		5111	29
30	0.6069		5973		5878		5786		5695		5607		5520		5435		5351		5269		5189		5110		30
31		6067		5971		5877		5784		5694		5605		5518		5433		5350		5268		5187		5108	31
32		6066		5969		5875		5783		5692		5604		5517		5432		5348		5266		5186		5107	32
33		6064		5968		5874		5781		5691		5602		5516		5430		5347		5265		5185		5106	33
34		6063		5966		5872		5780		5689		5601		5514		5429		5346		5264		5183		5105	34
35	0.6061		5965		5870		5778		5688		5599		5513		5428		5344		5262		5182		5103		35
36		6059		5963		5869		5777		5686		5598		5511		5426		5343		5261		5181		5102	36
37		6058		5961		5867		5775		5685		5596		5510		5425		5341		5260		5179		5101	37
38		6056		5960		5866		5774		5683		5595		5508		5423		5340		5258		5178		5099	38
39		6055		5958		5864		5772		5682		5594		5507		5422		5339		5257		5177		5098	39
40	0.6053		5957		5863		5771		5680		5592		5506		5421		5337		5256		5175		5097		40
41		6051		5955		5861		5769		5679		5591		5504		5419		5336		5254		5174		5095	41
42		6050		5954		5860		5768		5677		5589		5503		5418		5335		5253		5173		5094	42
43		6048		5952		5858		5766		5676		5588		5501		5416		5333		5252		5172		5093	43
44		6046		5950		5856		5765		5674		5586		5500		5415		5332		5250		5170		5092	44
45	0.6045		5949		5855		5763		5673		5585		5498		5414		5331		5249		5169		5090		45
46		6043		5947		5853		5761		5671		5583		5497		5412		5329		5248		5168		5089	46
47		6042		5946		5852		5760		5670		5582		5496		5411		5328		5246		5166		5088	47
48		6040		5944		5850		5758		5669		5580		5494		5409		5326		5245		5165		5086	48
49		6038		5942		5849		5757		5667		5579		5493		5408		5325		5244		5164		5085	49
50	0.6037		5941		5847		5755		5666		5578		5491		5407		5324		5242		5162		5084		50
51		6035		5939		5846		5754		5664		5576		5490		5405		5322		5241		5161		5082	51
52		6033		5938		5844		5752		5663		5575		5488		5404		5321		5240		5160		5081	52
53		6032		5936		5843		5751		5661		5573		5487		5402		5320		5238		5158		5080	53
54		6030		5935		5841		5749		5660		5572		5486		5401		5318		5237		5157		5079	54
55	0.6029		5933		5839		5748		5658		5570		5484		5400		5317		5235		5156		5077		55
56		6027		5931		5838		5746		5657		5569		5483		5398		5315		5234		5154		5076	56
57		6025		5930		5836		5745		5655		5567		5481		5397		5314		5233		5153		5075	57
58		6024		5928		5835		5743		5654		5566		5480		5395		5313		5231		5152		5073	58
59		6022		5927		5833		5742		5652		5564		5478		5394		5311		5230		5150		5072	59
	0	44	0	45	0	46	0	47	0	48	0	49	0	50	0	51	0	52	0	53	0	54	0	55	

Proportional Logarithms

″ s.	° ′ h. m 0 56	° ′ h. m. 0 57	° ′ h. m. 0 58	° ′ h. m. 0 59	° ′ h. m. 1 0	° ′ h. m. 1 1	° ′ h. m 1 2	° ′ h. m. 1 3	° ′ h. m. 1 4	° ′ h. m. 1 5	° ′ h. m. 1 6	° ′ h. m. 1 7	″ s.
0	0.5071	4994	4918	4844	4771	4699	4629	4559	4491	4424	4357	4292	0
1	5070	4993	4917	4843	4770	4698	4628	4558	4490	4422	4356	4291	1
2	5068	4991	4916	4842	4769	4697	4626	4557	4489	4421	4355	4290	2
3	5067	4990	4915	4841	4768	4696	4625	4556	4488	4420	4354	4289	3
4	5066	4989	4913	4839	4766	4695	4624	4555	4486	4419	4353	4288	4
5	0.5064	4988	4912	4838	4765	4693	4623	4554	4485	4418	4352	4287	5
6	5063	4986	4911	4837	4764	4692	4622	4552	4484	4417	4351	4285	6
7	5062	4985	4910	4836	4763	4691	4621	4551	4483	4416	4350	4284	7
8	5061	4984	4908	4834	4762	4690	4619	4550	4482	4415	4349	4283	8
9	5059	4983	4907	4833	4760	4689	4618	4549	4481	4414	4347	4282	9
10	0.5058	4981	4906	4832	4759	4688	4617	4548	4480	4412	4346	4281	10
11	5057	4980	4905	4831	4758	4686	4616	4547	4479	4411	4345	4280	11
12	5055	4979	4903	4830	4757	4685	4615	4546	4477	4410	4344	4279	12
13	5054	4977	4902	4828	4756	4684	4614	4544	4476	4409	4343	4278	13
14	5053	4976	4901	4827	4754	4683	4612	4543	4475	4408	4342	4277	14
15	0.5051	4975	4900	4826	4753	4682	4611	4542	4474	4407	4341	4276	15
16	5050	4974	4899	4825	4752	4680	4610	4541	4473	4406	4340	4275	16
17	5049	4972	4897	4823	4751	4679	4609	4540	4472	4405	4339	4274	17
18	5048	4971	4896	4822	4750	4678	4608	4539	4471	4404	4338	4273	18
19	5046	4970	4895	4821	4748	4677	4607	4538	4469	4402	4336	4271	19
20	0.5045	4969	4894	4820	4747	4676	4606	4536	4468	4401	4335	4270	20
21	5044	4967	4892	4819	4746	4675	4604	4535	4467	4400	4334	4269	21
22	5043	4966	4891	4817	4745	4673	4603	4534	4466	4399	4333	4268	22
23	5041	4965	4890	4816	4744	4672	4602	4533	4465	4398	4332	4267	23
24	5040	4964	4889	4815	4742	4671	4601	4532	4464	4397	4331	4266	24
25	0.5039	4962	4887	4814	4741	4670	4600	4531	4463	4396	4330	4265	25
26	5037	4961	4886	4812	4740	4669	4599	4530	4462	4395	4329	4264	26
27	5036	4960	4885	4811	4739	4668	4597	4528	4460	4394	4328	4263	27
28	5035	4959	4884	4810	4738	4666	4596	4527	4459	4393	4327	4262	28
29	5034	4957	4882	4809	4736	4665	4595	4526	4458	4391	4326	4261	29
30	0.5032	4956	4881	4808	4735	4664	4594	4525	4457	4390	4325	4260	30
31	5031	4955	4880	4806	4734	4663	4593	4524	4456	4389	4323	4259	31
32	5030	4954	4879	4805	4733	4662	4592	4523	4455	4388	4322	4258	32
33	5028	4952	4877	4804	4732	4660	4590	4522	4454	4387	4321	4256	33
34	5027	4951	4876	4803	4730	4659	4589	4520	4453	4386	4320	4255	34
35	0.5026	4950	4875	4801	4729	4658	4588	4519	4452	4385	4319	4254	35
36	5025	4949	4874	4800	4728	4657	4587	4518	4450	4384	4318	4253	36
37	5023	4947	4873	4799	4727	4656	4586	4517	4449	4383	4317	4252	37
38	5022	4946	4871	4798	4726	4655	4585	4516	4448	4381	4316	4251	38
39	5021	4945	4870	4797	4724	4653	4584	4515	4447	4380	4315	4250	39
40	0.5019	4943	4869	4795	4723	4652	4582	4514	4446	4379	4314	4249	40
41	5018	4942	4868	4794	4722	4651	4581	4512	4445	4378	4313	4248	41
42	5017	4941	4866	4793	4721	4650	4580	4511	4444	4377	4311	4247	42
43	5016	4940	4865	4792	4720	4649	4579	4510	4443	4376	4310	4246	43
44	5014	4938	4864	4791	4718	4648	4578	4509	4441	4375	4309	4245	44
45	0.5013	4937	4863	4789	4717	4646	4577	4508	4440	4374	4308	4244	45
46	5012	4936	4861	4788	4716	4645	4575	4507	4439	4373	4307	4243	46
47	5011	4935	4860	4787	4715	4644	4574	4506	4438	4372	4306	4241	47
48	5009	4933	4859	4786	4714	4643	4573	4505	4437	4370	4305	4240	48
49	5008	4932	4858	4785	4712	4642	4572	4503	4436	4369	4304	4239	49
50	0.5007	4931	4856	4783	4711	4640	4571	4502	4435	4368	4303	4238	50
51	5005	4930	4855	4782	4710	4639	4570	4501	4434	4367	4302	4237	51
52	5004	4928	4854	4781	4709	4638	4569	4500	4433	4366	4301	4236	52
53	5003	4927	4853	4780	4708	4637	4567	4499	4431	4365	4300	4235	53
54	5002	4926	4852	4778	4707	4636	4566	4498	4430	4364	4298	4234	54
55	0.5000	4925	4850	4777	4705	4635	4565	4497	4429	4363	4297	4233	55
56	4999	4923	4849	4776	4704	4633	4564	4495	4428	4362	4296	4232	56
57	4998	4922	4848	4775	4703	4632	4563	4494	4427	4361	4295	4231	57
58	4997	4921	4847	4774	4702	4631	4562	4493	4426	4359	4294	4230	58
59	4995	4920	4845	4772	4701	4630	4560	4492	4425	4358	4293	4229	59
	0 56	0 57	0 58	0 59	1 0	1 1	1 2	1 3	1 4	1 5	1 6	1 7	

Proportional Logarithms.

// s.	° ′ h. m. 1 8	° ′ h. m. 1 9	° ′ h. m. 1 10	° ′ h. m. 1 11	° ′ h. m. 1 12	° ′ h. m. 1 13	° ′ h. m. 1 14	° ′ h. m. 1 15	° ′ h. m. 1 16	° ′ h. m. 1 17	° ′ h. m. 1 18	° ′ h. m. 1 19	// s.
0	0.4228	4164	4102	4040	3979	3919	3860	3802	3745	3688	3632	3576	0
1	4227	4163	4101	4039	3978	3919	3859	3801	3744	3687	3631	3576	1
2	4226	4162	4100	4038	3977	3918	3858	3800	3743	3686	3630	3575	2
3	4224	4161	4099	4037	3976	3917	3857	3799	3742	3685	3629	3574	3
4	4223	4160	4098	4036	3975	3916	3856	3798	3741	3684	3628	3573	4
5	0.4222	4159	4097	4035	3974	3915	3856	3797	3740	3683	3627	3572	5
6	4221	4158	4096	4034	3973	3914	3855	3796	3739	3682	3626	3571	6
7	4220	4157	4095	4033	3972	3913	3854	3795	3738	3681	3625	3570	7
8	4219	4156	4093	4032	3971	3912	3853	3794	3737	3680	3624	3569	8
9	4218	4155	4092	4031	3970	3911	3852	3793	3736	3679	3623	3568	9
10	0.4217	4154	4091	4030	3969	3910	3851	3792	3735	3678	3623	3567	10
11	4216	4153	4090	4029	3968	3909	3850	3792	3734	3677	3622	3566	11
12	4215	4152	4089	4028	3967	3908	3849	3791	3733	3677	3621	3565	12
13	4214	4151	4088	4027	3966	3907	3848	3790	3732	3676	3620	3565	13
14	4213	4150	4087	4026	3965	3906	3847	3789	3731	3675	3619	3564	14
15	0.4212	4149	4086	4025	3964	3905	3846	3788	3730	3674	3618	3563	15
16	4211	4147	4085	4024	3963	3904	3845	3787	3729	3673	3617	3562	16
17	4210	4146	4084	4023	3962	3903	3844	3786	3728	3672	3616	3561	17
18	4209	4145	4083	4022	3961	3902	3843	3785	3727	3671	3615	3560	18
19	4207	4144	4082	4021	3960	3901	3842	3784	3727	3670	3614	3559	19
20	0.4206	4143	4081	4020	3959	3900	3841	3783	3726	3669	3613	3558	20
21	4205	4142	4080	4019	3958	3899	3840	3782	3725	3668	3612	3557	21
22	4204	4141	4079	4018	3957	3898	3839	3781	3724	3667	3611	3556	22
23	4203	4140	4078	4017	3956	3897	3838	3780	3723	3666	3610	3555	23
24	4202	4139	4077	4016	3955	3896	3837	3779	3722	3665	3610	3555	24
25	0.4201	4138	4076	4015	3954	3895	3836	3778	3721	3664	3609	3554	25
26	4200	4137	4075	4014	3953	3894	3835	3777	3720	3663	3608	3553	26
27	4199	4136	4074	4013	3952	3893	3834	3776	3719	3663	3607	3552	27
28	4198	4135	4073	4012	3951	3892	3833	3775	3718	3662	3606	3551	28
29	4197	4134	4072	4011	3950	3891	3832	3774	3717	3661	3605	3550	29
30	0.4196	4133	4071	4010	3949	3890	3831	3773	3716	3660	3604	3549	30
31	4195	4132	4070	4009	3948	3889	3830	3772	3715	3659	3603	3548	31
32	4194	4131	4069	4008	3947	3888	3829	3771	3714	3658	3602	3547	32
33	4193	4130	4068	4007	3946	3887	3828	3770	3713	3657	3601	3546	33
34	4192	4129	4067	4006	3945	3886	3827	3769	3712	3656	3600	3545	34
35	0.4191	4128	4066	4005	3944	3885	3826	3768	3711	3655	3599	3545	35
36	4189	4127	4065	4004	3943	3884	3825	3768	3710	3654	3598	3544	36
37	4188	4126	4064	4003	3942	3883	3824	3767	3709	3653	3598	3543	37
38	4187	4125	4063	4002	3941	3882	3823	3766	3709	3652	3597	3542	38
39	4186	4124	4062	4001	3940	3881	3822	3765	3708	3651	3596	3541	39
40	0.4185	4122	4061	4000	3939	3880	3821	3764	3707	3650	3595	3540	40
41	4184	4121	4060	3999	3938	3879	3820	3763	3706	3649	3594	3539	41
42	4183	4120	4059	3998	3937	3878	3820	3762	3705	3649	3593	3538	42
43	4182	4119	4058	3997	3936	3877	3819	3761	3704	3648	3592	3537	43
44	4181	4118	4056	3996	3935	3876	3818	3760	3703	3647	3591	3536	44
45	0.4180	4117	4055	3995	3934	3875	3817	3759	3702	3646	3590	3535	45
46	4179	4116	4054	3993	3933	3874	3816	3758	3701	3645	3589	3535	46
47	4178	4115	4053	3992	3932	3873	3815	3757	3700	3644	3588	3534	47
48	4177	4114	4052	3991	3931	3872	3814	3756	3699	3643	3587	3533	48
49	4176	4113	4051	3990	3930	3871	3813	3755	3698	3642	3587	3532	49
50	0.4175	4112	4050	3989	3929	3870	3812	3754	3697	3641	3586	3531	50
51	4174	4111	4049	3988	3928	3869	3811	3753	3696	3640	3585	3530	51
52	4173	4110	4048	3987	3927	3868	3810	3752	3695	3639	3584	3529	52
53	4172	4109	4047	3986	3926	3867	3809	3751	3694	3638	3583	3528	53
54	4171	4108	4046	3985	3925	3866	3808	3750	3693	3637	3582	3527	54
55	0.4169	4107	4045	3984	3924	3865	3807	3749	3693	3636	3581	3526	55
56	4168	4106	4044	3983	3923	3864	3806	3748	3692	3635	3580	3525	56
57	4167	4105	4043	3982	3922	3863	3805	3747	3691	3635	3579	3525	57
58	4166	4104	4042	3981	3921	3862	3804	3746	3690	3634	3578	3524	58
59	4165	4103	4041	3980	3920	3861	3803	3746	3689	3633	3577	3523	59
	1 8	1 9	1 10	1 11	1 12	1 13	1 14	1 15	1 16	1 17	1 18	1 19	

Proportional Logarithms.

″ s.	° ′ h. m. 1 20	° ′ h. m. 1 21	° ′ h. m. 1 22	° ′ h. m. 1 23	° ′ h. m. 1 24	° ′ h. m. 1 25	° ′ h. m. 1 26	° ′ h. m. 1 27	° ′ h. m. 1 28	° ′ h. m. 1 29	° ′ h. m. 1 30	° ′ h. m. 1 31	″ s.
0	0.3522	3468	3415	3362	3310	3259	3208	3158	3108	3059	3010	2962	0
1	3521	3467	3414	3361	3309	3258	3207	3157	3107	3058	3009	2962	1
2	3520	3466	3413	3360	3308	3257	3206	3156	3106	3057	3009	2961	2
3	3519	3465	3412	3359	3307	3256	3205	3155	3105	3056	3008	2960	3
4	3518	3464	3411	3358	3306	3255	3204	3154	3105	3056	3007	2959	4
5	0.3517	3463	3410	3358	3306	3254	3204	3153	3104	3055	3006	2958	5
6	3516	3463	3409	3357	3305	3253	3203	3153	3103	3054	3005	2958	6
7	3515	3462	3408	3356	3304	3253	3202	3152	3102	3053	3005	2957	7
8	3514	3461	3408	3355	3303	3252	3201	3151	3101	3052	3004	2956	8
9	3514	3460	3407	3354	3302	3251	3200	3150	3101	3052	3003	2955	9
10	0.3513	3459	3406	3353	3301	3250	3199	3149	3100	3051	3002	2954	10
11	3512	3458	3405	3352	3300	3249	3198	3148	3099	3050	3001	2954	11
12	3511	3457	3404	3351	3300	3248	3198	3148	3098	3049	3001	2953	12
13	3510	3456	3403	3351	3299	3247	3197	3147	3097	3048	3000	2952	13
14	3509	3455	3402	3350	3298	3247	3196	3146	3096	3047	2999	2951	14
15	0.3508	3454	3401	3349	3297	3246	3195	3145	3096	3047	2998	2950	15
16	3507	3454	3400	3348	3296	3245	3194	3144	3095	3046	2997	2950	16
17	3506	3453	3400	3347	3295	3244	3193	3143	3094	3045	2997	2949	17
18	3506	3452	3399	3346	3294	3243	3193	3143	3093	3044	2996	2948	18
19	3505	3451	3398	3345	3294	3242	3192	3142	3092	3043	2995	2947	19
20	0.3504	3450	3397	3345	3293	3242	3191	3141	3091	3043	2994	2946	20
21	3503	3449	3396	3344	3292	3241	3190	3140	3091	3042	2993	2946	21
22	3502	3448	3395	3343	3291	3240	3189	3139	3090	3041	2993	2945	22
23	3501	3447	3394	3342	3290	3239	3188	3138	3089	3040	2992	2944	23
24	3500	3446	3393	3341	3289	3238	3188	3138	3088	3039	2991	2943	24
25	0.3499	3446	3393	3340	3288	3237	3187	3137	3087	3039	2990	2942	25
26	3498	3445	3392	3339	3288	3236	3186	3136	3087	3038	2989	2942	26
27	3497	3444	3391	3338	3287	3236	3185	3135	3086	3037	2989	2941	27
28	3497	3443	3390	3338	3286	3235	3184	3134	3085	3036	2988	2940	28
29	3496	3442	3389	3337	3285	3234	3183	3133	3084	3035	2987	2939	29
30	0.3495	3441	3388	3336	3284	3233	3183	3133	3083	3034	2986	2939	30
31	3494	3440	3387	3335	3283	3232	3182	3132	3082	3034	2985	2938	31
32	3493	3439	3386	3334	3282	3231	3181	3131	3082	3033	2985	2937	32
33	3492	3438	3386	3333	3282	3231	3180	3130	3081	3032	2984	2936	33
34	3491	3438	3385	3332	3281	3230	3179	3129	3080	3031	2983	2935	34
35	0.3490	3437	3384	3332	3280	3229	3178	3129	3079	3030	2982	2935	35
36	3489	3436	3383	3331	3279	3228	3178	3128	3078	3030	2981	2934	36
37	3488	3435	3382	3330	3278	3227	3177	3127	3078	3029	2981	2933	37
38	3488	3434	3381	3329	3277	3226	3176	3126	3077	3028	2980	2932	38
39	3487	3433	3380	3328	3276	3225	3175	3125	3076	3027	2979	2931	39
40	0.3486	3432	3379	3327	3276	3225	3174	3124	3075	3026	2978	2931	40
41	3485	3431	3379	3326	3275	3224	3173	3124	3074	3026	2977	2930	41
42	3484	3431	3378	3325	3274	3223	3173	3123	3073	3025	2977	2929	42
43	3483	3430	3377	3325	3273	3222	3172	3122	3073	3024	2976	2928	43
44	3482	3429	3376	3324	3272	3221	3171	3121	3072	3023	2975	2927	44
45	0.3481	3428	3375	3323	3271	3220	3170	3120	3071	3022	2974	2927	45
46	3480	3427	3374	3322	3270	3220	3169	3119	3070	3022	2973	2926	46
47	3480	3426	3373	3321	3270	3219	3168	3119	3069	3021	2973	2925	47
48	3479	3425	3372	3320	3269	3218	3168	3118	3069	3020	2972	2924	48
49	3478	3424	3372	3319	3268	3217	3167	3117	3068	3019	2971	2924	49
50	0.3477	3423	3371	3319	3267	3216	3166	3116	3067	3018	2970	2923	50
51	3476	3423	3370	3318	3266	3215	3165	3115	3066	3018	2969	2922	51
52	3475	3422	3369	3317	3265	3214	3164	3114	3065	3017	2969	2921	52
53	3474	3421	3368	3316	3265	3214	3163	3114	3065	3016	2968	2920	53
54	3473	3420	3367	3315	3264	3213	3163	3113	3064	3015	2967	2920	54
55	0.3472	3419	3366	3314	3263	3212	3162	3112	3063	3014	2966	2919	55
56	3471	3418	3365	3313	3262	3211	3161	3111	3062	3014	2965	2918	56
57	3471	3417	3365	3313	3261	3210	3160	3110	3061	3013	2965	2917	57
58	3470	3416	3364	3312	3260	3209	3159	3110	3060	3012	2964	2916	58
59	3469	3415	3363	3311	3259	3209	3158	3109	3060	3011	2963	2916	59
	1 20	1 21	1 22	1 23	1 24	1 25	1 26	1 27	1 28	1 29	1 30	1 31	

TABLE XIX

Proportional Logarithms.

" s.	° ′ h. m. 1 32	° ′ h. m. 1 33	° ′ h. m. 1 34	° ′ h. m. 1 35	° ′ h. m. 1 36	° ′ h. m. 1 37	° ′ h. m. 1 38	° ′ h. m. 1 39	° ′ h. m. 1 40	° ′ h. m. 1 41	° ′ h. m. 1 42	° ′ h. m. 1 43	" s.
0	0.2915	2868	2821	2775	2730	2685	2640	2596	2553	2510	2467	2424	0
1	2914	2867	2821	2775	2729	2684	2640	2596	2552	2509	2466	2424	1
2	2913	2866	2820	2774	2729	2684	2639	2595	2551	2508	2465	2423	2
3	2912	2866	2819	2773	2728	2683	2638	2594	2551	2507	2465	2422	3
4	2912	2865	2818	2772	2727	2682	2638	2593	2550	2507	2464	2422	4
5	0.2911	2864	2818	2772	2726	2681	2637	2593	2549	2506	2463	2421	5
6	2910	2863	2817	2771	2725	2681	2636	2592	2548	2505	2462	2420	6
7	2909	2862	2816	2770	2725	2680	2635	2591	2548	2504	2462	2419	7
8	2909	2862	2815	2769	2724	2679	2636	2591	2547	2504	2461	2419	8
9	2908	2861	2815	2769	2723	2678	2634	2590	2546	2503	2460	2418	9
10	0.2907	2860	2814	2768	2722	2678	2633	2589	2545	2502	2460	2417	10
11	2906	2859	2813	2767	2722	2677	2632	2588	2545	2502	2459	2417	11
12	2905	2859	2812	2766	2721	2676	2632	2588	2544	2501	2458	2416	12
13	2905	2858	2811	2766	2720	2675	2631	2587	2543	2500	2458	2415	13
14	2904	2857	2811	2765	2719	2675	2630	2586	2543	2499	2457	2415	14
15	0.2903	2856	2810	2764	2719	2674	2629	2585	2542	2499	2456	2414	15
16	2902	2855	2809	2763	2718	2673	2629	2585	2541	2498	2455	2413	16
17	2901	2855	2808	2763	2717	2672	2628	2584	2540	2497	2455	2412	17
18	2901	2854	2808	2762	2716	2672	2627	2583	2540	2497	2454	2412	18
19	2900	2853	2807	2761	2716	2671	2626	2583	2539	2496	2453	2411	19
20	0.2899	2852	2806	2760	2715	2670	2626	2582	2538	2495	2453	2410	20
21	2898	2852	2805	2760	2714	2669	2625	2581	2538	2494	2452	2410	21
22	2898	2851	2805	2759	2713	2669	2624	2580	2537	2494	2451	2409	22
23	2897	2850	2804	2758	2713	2668	2624	2580	2536	2493	2450	2408	23
24	2896	2849	2803	2757	2712	2667	2623	2579	2535	2492	2450	2408	24
25	0.2895	2848	2802	2756	2711	2666	2622	2578	2535	2492	2449	2407	25
26	2894	2848	2801	2756	2710	2666	2621	2577	2534	2491	2448	2406	26
27	2894	2847	2801	2755	2710	2665	2621	2577	2533	2490	2448	2405	27
28	2893	2846	2800	2754	2709	2664	2620	2576	2533	2489	2447	2405	28
29	2892	2845	2799	2753	2708	2663	2619	2575	2532	2489	2446	2404	29
30	0.2891	2845	2798	2753	2707	2663	2618	2574	2531	2488	2445	2403	30
31	2891	2844	2798	2752	2707	2662	2618	2574	2530	2487	2445	2403	31
32	2890	2843	2797	2751	2706	2661	2617	2573	2530	2487	2444	2402	32
33	2889	2842	2796	2750	2705	2660	2616	2572	2529	2486	2443	2401	33
34	2888	2842	2795	2750	2704	2660	2615	2572	2528	2485	2443	2401	34
35	0.2887	2841	2795	2749	2704	2659	2615	2571	2527	2485	2442	2400	35
36	2887	2840	2794	2748	2703	2658	2614	2570	2527	2484	2441	2399	36
37	2886	2839	2793	2747	2702	2657	2613	2569	2526	2483	2441	2398	37
38	2885	2838	2792	2747	2701	2657	2612	2569	2525	2482	2440	2398	38
39	2885	2838	2792	2746	2701	2656	2612	2568	2525	2482	2439	2397	39
40	0.2883	2837	2791	2745	2700	2655	2611	2567	2524	2481	2438	2396	40
41	2883	2836	2790	2744	2699	2655	2610	2566	2523	2480	2438	2396	41
42	2882	2835	2789	2744	2698	2654	2610	2566	2522	2480	2437	2395	42
43	2881	2835	2788	2743	2698	2653	2609	2565	2522	2479	2436	2394	43
44	2880	2834	2788	2742	2697	2652	2608	2564	2521	2478	2436	2394	44
45	0.2880	2833	2787	2741	2696	2652	2607	2564	2520	2477	2435	2393	45
46	2879	2832	2786	2741	2695	2651	2607	2563	2520	2477	2434	2392	46
47	2878	2831	2785	2740	2695	2650	2606	2562	2519	2476	2433	2391	47
48	2877	2831	2785	2739	2694	2649	2605	2561	2518	2475	2433	2391	48
49	2876	2830	2784	2738	2693	2649	2604	2561	2517	2475	2432	2390	49
50	0.2876	2829	2783	2738	2692	2648	2604	2560	2517	2474	2431	2389	50
51	2875	2828	2782	2737	2692	2647	2603	2559	2516	2473	2431	2389	51
52	2874	2828	2782	2736	2691	2646	2602	2559	2515	2472	2430	2388	52
53	2873	2827	2781	2735	2690	2646	2601	2558	2515	2472	2429	2387	53
54	2873	2826	2780	2735	2689	2645	2601	2557	2514	2471	2429	2387	54
55	0.2872	2825	2779	2734	2689	2644	2600	2556	2513	2470	2428	2386	55
56	2871	2825	2779	2733	2688	2643	2599	2556	2512	2470	2427	2385	56
57	2870	2824	2778	2732	2687	2643	2599	2555	2512	2469	2426	2384	57
58	2869	2823	2777	2732	2687	2642	2598	2554	2511	2468	2426	2384	58
59	2869	2822	2776	2731	2686	2641	2597	2553	2510	2467	2425	2383	59
	1 32	1 33	1 34	1 35	1 36	1 37	1 38	1 39	1 40	1 41	1 42	1 43	

Proportional Logarithms.

" s.	° ′ h. m 1 44	° ′ h. m. 1 45	° ′ h. m. 1 46	° ′ h. m. 1 47	° ′ h. m. 1 48	° ′ h. m 1 49	° ′ h. m 1 50	° ′ h. m 1 51	° ′ h. m. 1 52	° ′ h. m. 1 53	° ′ h. m. 1 54	° ′ h. m. 1 55	" s.
0	0.2382	2341	2300	2259	2218	2178	2139	2099	2061	2022	1984	1946	0
1	2382	2340	2299	2258	2218	2178	2138	2099	2060	2021	1983	1945	1
2	2381	2339	2298	2258	2217	2177	2137	2098	2059	2021	1982	1944	2
3	2380	2339	2298	2257	2216	2176	2137	2098	2059	2020	1982	1944	3
4	2380	2338	2297	2256	2216	2176	2136	2097	2058	2019	1981	1943	4
5	0.2379	2337	2296	2256	2215	2175	2136	2096	2057	2019	1981	1943	5
6	2378	2337	2296	2255	2214	2174	2135	2096	2057	2018	1980	1942	6
7	2378	2336	2295	2254	2214	2174	2134	2095	2056	2017	1979	1941	7
8	2377	2335	2294	2253	2213	2173	2134	2094	2055	2017	1979	1941	8
9	2376	2335	2294	2253	2212	2172	2133	2094	2055	2016	1978	1940	9
10	0.2375	2334	2293	2252	2212	2172	2132	2093	2054	2016	1977	1939	10
11	2375	2333	2292	2251	2211	2171	2132	2092	2053	2015	1977	1939	11
12	2374	2333	2291	2251	2210	2170	2131	2092	2053	2014	1976	1938	12
13	2373	2332	2291	2250	2210	2170	2130	2091	2052	2014	1975	1938	13
14	2373	2331	2290	2249	2209	2169	2130	2090	2052	2013	1975	1937	14
15	0.2372	2331	2289	2249	2208	2169	2129	2090	2051	2012	1974	1936	15
16	2371	2330	2289	2248	2208	2168	2128	2089	2050	2012	1974	1936	16
17	2371	2329	2288	2247	2207	2167	2128	2088	2050	2011	1973	1935	17
18	2370	2328	2287	2247	2206	2167	2127	2088	2049	2010	1972	1934	18
19	2369	2328	2287	2246	2206	2166	2126	2087	2048	2010	1972	1934	19
20	0.2368	2327	2286	2245	2205	2165	2126	2086	2048	2009	1971	1933	20
21	2368	2326	2285	2245	2204	2165	2125	2086	2047	2009	1970	1933	21
22	2367	2326	2285	2244	2204	2164	2124	2085	2046	2008	1970	1932	22
23	2366	2325	2284	2243	2203	2163	2124	2085	2046	2007	1969	1931	23
24	2366	2324	2283	2243	2202	2163	2123	2084	2045	2007	1968	1931	24
25	0.2365	2324	2283	2242	2202	2162	2122	2083	2044	2006	1968	1930	25
26	2364	2323	2282	2241	2201	2161	2122	2083	2044	2005	1967	1929	26
27	2364	2322	2281	2241	2200	2161	2121	2082	2043	2005	1967	1929	27
28	2363	2322	2281	2240	2200	2160	2120	2081	2042	2004	1966	1928	28
29	2362	2321	2280	2239	2199	2159	2120	2081	2042	2003	1965	1928	29
30	0.2362	2320	2279	2239	2198	2159	2119	2080	2041	2003	1965	1927	30
31	2361	2320	2279	2238	2198	2158	2118	2079	2041	2002	1964	1926	31
32	2360	2319	2278	2237	2197	2157	2118	2079	2040	2001	1963	1926	32
33	2359	2318	2277	2237	2196	2157	2117	2078	2039	2001	1963	1925	33
34	2359	2317	2277	2236	2196	2156	2116	2077	2039	2000	1962	1924	34
35	0.2358	2317	2276	2235	2195	2155	2116	2077	2038	2000	1962	1924	35
36	2357	2316	2275	2235	2194	2155	2115	2076	2037	1999	1961	1923	36
37	2357	2315	2274	2234	2194	2154	2115	2075	2037	1998	1960	1923	37
38	2356	2315	2274	2233	2193	2153	2114	2075	2036	1998	1960	1922	38
39	2355	2314	2273	2233	2192	2153	2113	2074	2035	1997	1959	1921	39
40	0.2355	2313	2272	2232	2192	2152	2113	2073	2035	1996	1958	1921	40
41	2354	2313	2272	2231	2191	2151	2112	2073	2034	1996	1958	1920	41
42	2353	2312	2271	2231	2190	2151	2111	2072	2033	1995	1957	1919	42
43	2353	2311	2270	2230	2190	2150	2111	2072	2033	1994	1956	1919	43
44	2352	2311	2270	2229	2189	2149	2110	2071	2032	1994	1956	1918	44
45	0.2351	2310	2269	2229	2188	2149	2109	2070	2032	1993	1955	1918	45
46	2350	2309	2268	2228	2188	2148	2109	2070	2031	1993	1955	1917	46
47	2350	2309	2268	2227	2187	2147	2108	2069	2030	1992	1954	1916	47
48	2349	2308	2267	2227	2186	2147	2107	2068	2030	1991	1953	1916	48
49	2348	2307	2266	2226	2186	2146	2107	2068	2029	1991	1953	1915	49
50	0.2348	2307	2266	2225	2185	2145	2106	2067	2028	1990	1952	1914	50
51	2347	2306	2265	2225	2184	2145	2105	2066	2028	1989	1951	1914	51
52	2346	2305	2264	2224	2184	2144	2105	2066	2027	1989	1951	1913	52
53	2346	2304	2264	2223	2183	2143	2104	2065	2026	1988	1950	1913	53
54	2345	2304	2263	2223	2182	2143	2103	2064	2026	1987	1950	1912	54
55	0.2344	2303	2262	2222	2182	2142	2103	2064	2025	1987	1949	1911	55
56	2344	2302	2262	2221	2181	2141	2102	2063	2025	1986	1948	1911	56
57	2343	2302	2261	2220	2180	2141	2101	2062	2024	1986	1948	1910	57
58	2342	2301	2260	2220	2180	2140	2101	2062	2023	1985	1947	1909	58
59	2342	2300	2260	2219	2179	2139	2100	2061	2023	1984	1946	1909	59
	1 44	1 45	1 46	1 47	1 48	1 49	1 50	1 51	1 52	1 53	1 54	1 55	

PROPORTIONAL LOGARITHMS

" s.	° ′ ″ h. m.	° ′ h. m.	° ′ h. m.	° ′ h. m.	° ′ h. m.	° ′ h. m.	° ′ h. m.	° ′ h. m.	° ′ h. m.	° ′ h. m.	° ′ h. m.	° ′ h. m.	° ′ h. m.	" s.
	1 56	1 57	1 58	1 59	2 0	2 1	2 2	2 3	2 4	2 5	2 6	2 7		
0	0.1908	1871	1834	1797	1761	1725	1689	1654	1619	1584	1549	1515		0
1	1908	1870	1833	1797	1760	1724	1689	1653	1618	1583	1548	1514		1
2	1907	1870	1833	1796	1760	1724	1688	1652	1617	1582	1548	1514		2
3	1906	1869	1832	1795	1759	1723	1687	1652	1617	1582	1547	1513		3
4	1906	1868	1831	1795	1759	1722	1687	1651	1616	1581	1547	1512		4
5	0.1905	1868	1831	1794	1758	1722	1686	1651	1616	1581	1546	1512		5
6	1904	1867	1830	1794	1757	1721	1686	1650	1615	1580	1546	1511		6
7	1904	1867	1830	1793	1757	1721	1685	1650	1614	1580	1545	1511		7
8	1903	1866	1829	1792	1756	1720	1684	1649	1614	1579	1544	1510		8
9	1903	1865	1828	1792	1755	1719	1684	1648	1613	1578	1544	1510		9
10	0.1902	1865	1828	1791	1755	1719	1683	1648	1613	1578	1543	1509		10
11	1901	1864	1827	1791	1754	1718	1683	1647	1612	1577	1543	1508		11
12	1901	1863	1827	1790	1754	1718	1682	1647	1612	1577	1542	1508		12
13	1900	1863	1826	1789	1753	1717	1681	1646	1611	1576	1542	1507		13
14	1899	1862	1825	1789	1752	1717	1681	1645	1610	1576	1541	1507		14
15	0.1899	1862	1825	1788	1752	1716	1680	1645	1610	1575	1540	1506		15
16	1898	1861	1824	1788	1751	1715	1680	1644	1609	1574	1540	1506		16
17	1898	1860	1823	1787	1751	1715	1679	1644	1609	1574	1539	1505		17
18	1897	1860	1823	1786	1750	1714	1678	1643	1608	1573	1539	1504		18
19	1896	1859	1822	1786	1749	1714	1678	1643	1607	1573	1538	1504		19
20	0.1896	1859	1822	1785	1749	1713	1677	1642	1607	1572	1538	1503		20
21	1895	1858	1821	1785	1748	1712	1677	1641	1606	1571	1537	1503		21
22	1894	1857	1820	1784	1748	1712	1676	1641	1606	1571	1536	1502		22
23	1894	1857	1820	1783	1747	1711	1676	1640	1605	1570	1536	1502		23
24	1893	1856	1819	1783	1746	1711	1675	1640	1605	1570	1535	1501		24
25	0.1893	1855	1819	1782	1746	1710	1675	1639	1604	1569	1535	1500		25
26	1892	1855	1818	1781	1745	1709	1674	1638	1603	1569	1534	1500		26
27	1891	1854	1818	1781	1745	1709	1673	1638	1603	1568	1534	1499		27
28	1891	1854	1817	1780	1744	1708	1673	1637	1602	1567	1533	1499		28
29	1890	1853	1816	1780	1743	1708	1672	1637	1602	1567	1532	1498		29
30	0.1889	1852	1816	1779	1743	1707	1671	1636	1601	1566	1532	1498		30
31	1889	1852	1815	1778	1742	1706	1671	1635	1600	1566	1531	1497		31
32	1888	1851	1814	1778	1742	1706	1670	1635	1600	1565	1531	1496		32
33	1888	1850	1814	1777	1741	1705	1670	1634	1599	1565	1530	1496		33
34	1887	1850	1813	1777	1740	1705	1669	1634	1599	1564	1530	1495		34
35	0.1886	1849	1812	1776	1740	1704	1668	1633	1598	1563	1529	1495		35
36	1886	1849	1812	1775	1739	1703	1668	1633	1598	1563	1528	1494		36
37	1885	1848	1811	1775	1739	1703	1667	1632	1597	1562	1528	1494		37
38	1884	1847	1811	1774	1738	1702	1667	1631	1596	1562	1527	1493		38
39	1884	1847	1810	1774	1737	1702	1666	1631	1596	1561	1527	1493		39
40	0.1883	1846	1809	1773	1737	1701	1665	1630	1595	1561	1526	1492		40
41	1883	1846	1809	1772	1736	1700	1665	1630	1595	1560	1526	1491		41
42	1882	1845	1808	1772	1736	1700	1664	1629	1594	1559	1525	1491		42
43	1881	1844	1808	1771	1735	1699	1664	1628	1593	1559	1524	1490		43
44	1881	1844	1807	1771	1734	1699	1663	1628	1593	1558	1524	1490		44
45	0.1880	1843	1806	1770	1734	1698	1663	1627	1592	1558	1523	1489		45
46	1880	1843	1806	1769	1733	1697	1662	1627	1592	1557	1523	1489		46
47	1879	1842	1805	1769	1733	1697	1661	1626	1591	1556	1522	1488		47
48	1878	1841	1805	1768	1732	1696	1661	1626	1591	1556	1522	1487		48
49	1878	1841	1804	1768	1731	1696	1660	1625	1590	1555	1521	1487		49
50	0.1877	1840	1803	1767	1731	1695	1660	1624	1589	1555	1520	1486		50
51	1876	1839	1803	1766	1730	1694	1659	1624	1589	1554	1520	1486		51
52	1876	1839	1802	1766	1730	1694	1658	1623	1588	1554	1519	1485		52
53	1875	1838	1802	1765	1729	1693	1658	1623	1588	1553	1519	1485		53
54	1875	1838	1801	1765	1728	1693	1657	1622	1587	1552	1518	1484		54
55	0.1874	1837	1800	1764	1728	1692	1657	1621	1587	1552	1518	1483		55
56	1873	1836	1800	1763	1727	1692	1656	1621	1586	1551	1517	1483		56
57	1873	1836	1799	1763	1727	1691	1655	1620	1585	1551	1516	1482		57
58	1872	1835	1798	1762	1726	1690	1655	1620	1585	1550	1516	1482		58
59	1871	1835	1798	1762	1725	1690	1654	1619	1584	1550	1515	1481		59
	1 56	1 57	1 58	1 59	2 0	2 1	2 2	2 3	2 4	2 5	2 6	2 7		

Proportional Logarithms.

" s.	0 h. 2 m. 8	2 9	2 10	2 11	2 12	2 13	2 14	2 15	2 16	2 17	2 18	2 19	2 20	" s.
0	0.1481	1447	1413	1380	1347	1314	1282	1249	1217	1186	1154	1123	1091	0
1	1480	1446	1413	1379	1346	1314	1281	1249	1217	1185	1153	1122	1091	1
2	1479	1446	1412	1379	1346	1313	1281	1248	1216	1184	1153	1122	1090	2
3	1479	1445	1412	1378	1345	1313	1280	1248	1216	1184	1152	1121	1090	3
4	1478	1445	1411	1378	1345	1312	1280	1247	1215	1183	1152	1120	1089	4
5	0 1478	1444	1411	1377	1344	1311	1279	1247	1215	1183	1151	1120	1089	5
6	1477	1443	1410	1377	1344	1311	1278	1246	1214	1182	1151	1119	1088	6
7	1477	1443	1409	1376	1343	1310	1278	1246	1214	1182	1150	1119	1088	7
8	1476	1442	1409	1376	1343	1310	1277	1245	1213	1181	1150	1118	1087	8
9	1476	1442	1408	1375	1342	1309	1277	1245	1213	1181	1149	1118	1087	9
10	0.1475	1441	1408	1374	1342	1309	1276	1244	1212	1180	1149	1117	1086	10
11	1474	1441	1407	1374	1341	1308	1276	1243	1211	1180	1148	1117	1086	11
12	1474	1440	1407	1373	1340	1308	1275	1243	1211	1179	1148	1116	1085	12
13	1473	1440	1406	1373	1340	1307	1275	1242	1210	1179	1147	1116	1085	13
14	1473	1439	1406	1372	1339	1307	1274	1242	1210	1178	1147	1115	1084	14
15	0.1472	1438	1405	1372	1339	1306	1274	1241	1209	1178	1146	1115	1084	15
16	1472	1438	1404	1371	1338	1306	1273	1241	1209	1177	1146	1114	1083	16
17	1471	1437	1404	1371	1338	1305	1273	1240	1208	1177	1145	1114	1083	17
18	1470	1437	1403	1370	1337	1304	1272	1240	1208	1176	1145	1113	1082	18
19	1470	1436	1403	1370	1337	1304	1271	1239	1207	1175	1144	1113	1082	19
20	0.1469	1436	1402	1369	1336	1303	1271	1239	1207	1175	1143	1112	1081	20
21	1469	1435	1402	1368	1335	1303	1270	1238	1206	1174	1143	1112	1081	21
22	1468	1435	1401	1368	1335	1302	1270	1238	1206	1174	1142	1111	1080	22
23	1468	1434	1401	1367	1334	1302	1269	1237	1205	1173	1142	1111	1080	23
24	1467	1433	1400	1367	1334	1301	1269	1237	1205	1173	1141	1110	1079	24
25	0.1467	1433	1399	1366	1333	1301	1268	1236	1204	1172	1141	1110	1079	25
26	1466	1432	1399	1366	1333	1300	1268	1235	1204	1172	1140	1109	1078	26
27	1465	1432	1398	1365	1332	1300	1267	1235	1203	1171	1140	1109	1078	27
28	1465	1431	1398	1365	1332	1299	1267	1234	1202	1171	1139	1108	1077	28
29	1464	1431	1397	1364	1331	1298	1266	1234	1202	1170	1139	1108	1076	29
30	0.1464	1430	1397	1363	1331	1298	1266	1233	1201	1170	1138	1107	1076	30
31	1463	1429	1396	1363	1330	1297	1265	1233	1201	1169	1138	1106	1075	31
32	1463	1429	1396	1362	1329	1297	1264	1232	1200	1169	1137	1106	1075	32
33	1462	1428	1395	1362	1329	1296	1264	1232	1200	1168	1137	1105	1074	33
34	1461	1428	1394	1361	1328	1296	1263	1231	1199	1168	1136	1105	1074	34
35	0.1461	1427	1394	1361	1328	1295	1263	1231	1199	1167	1136	1104	1073	35
36	1460	1427	1393	1360	1327	1295	1262	1230	1198	1167	1135	1104	1073	36
37	1460	1426	1393	1360	1327	1294	1262	1230	1198	1166	1135	1103	1072	37
38	1459	1426	1392	1359	1326	1294	1261	1229	1197	1165	1134	1103	1072	38
39	1459	1425	1392	1359	1326	1293	1261	1229	1197	1165	1134	1102	1071	39
40	0.1458	1424	1391	1358	1325	1292	1260	1228	1196	1164	1133	1102	1071	40
41	1458	1424	1391	1357	1325	1292	1260	1227	1196	1164	1132	1101	1070	41
42	1457	1423	1390	1357	1324	1291	1259	1227	1195	1163	1132	1101	1070	42
43	1456	1423	1389	1356	1323	1291	1259	1226	1195	1163	1131	1100	1069	43
44	1456	1422	1389	1356	1323	1290	1258	1226	1194	1162	1131	1100	1069	44
45	0.1455	1422	1388	1355	1322	1290	1257	1225	1193	1162	1130	1099	1068	45
46	1455	1421	1388	1355	1322	1289	1257	1225	1193	1161	1130	1099	1068	46
47	1454	1421	1387	1354	1321	1289	1256	1224	1192	1161	1129	1098	1067	47
48	1454	1420	1387	1354	1321	1288	1256	1224	1192	1160	1129	1098	1067	48
49	1453	1419	1386	1353	1320	1288	1255	1223	1191	1160	1128	1097	1066	49
50	0.1452	1419	1386	1352	1320	1287	1255	1223	1191	1159	1128	1097	1066	50
51	1452	1418	1385	1352	1319	1287	1254	1222	1190	1159	1127	1096	1065	51
52	1451	1418	1384	1351	1319	1286	1254	1222	1190	1158	1127	1096	1065	52
53	1451	1417	1384	1351	1318	1285	1253	1221	1189	1158	1126	1095	1064	53
54	1450	1417	1383	1350	1317	1285	1253	1221	1189	1157	1126	1095	1064	54
55	0.1450	1416	1383	1350	1317	1284	1252	1220	1188	1157	1125	1094	1063	55
56	1449	1416	1382	1349	1316	1284	1252	1219	1188	1156	1125	1094	1063	56
57	1449	1415	1382	1349	1316	1283	1251	1219	1187	1156	1124	1093	1062	57
58	1448	1414	1381	1348	1315	1283	1250	1218	1187	1155	1124	1092	1062	58
59	1447	1414	1381	1348	1315	1282	1250	1218	1186	1154	1123	1092	1061	59
	2 8	2 9	2 10	2 11	2 12	2 13	2 14	2 15	2 16	2 17	2 18	2 19	2 20	

TABLE XIX.

Proportional Logarithms.

# s.	0 h. 2 m. 21	0 h. 2 m. 22	0 h. 2 m. 23	0 h. 2 m. 24	0 h. 2 m. 25	0 h. 2 m. 26	0 h. 2 m. 27	0 h. 2 m. 28	0 h. 2 m. 29	0 h. 2 m. 30	0 h. 2 m. 31	0 h. 2 m. 32	0 h. 2 m. 33	# s.
0	0.1061	1030	0999	0969	0939	0909	0880	0850	0821	0792	0763	0734	0706	0
1	1060	1029	0999	0969	0939	0909	0879	0850	0820	0791	0762	0734	0705	1
2	1060	1029	0998	0968	0938	0908	0879	0849	0820	0791	0762	0733	0705	2
3	1059	1028	0998	0968	0938	0908	0878	0849	0819	0790	0762	0733	0704	3
4	1058	1028	0997	0967	0937	0907	0878	0848	0819	0790	0761	0732	0704	4
5	0.1058	1027	0997	0967	0937	0907	0877	0848	0818	0789	0761	0732	0703	5
6	1057	1027	0996	0966	0936	0906	0877	0847	0818	0789	0760	0731	0703	6
7	1057	1026	0996	0966	0936	0906	0876	0847	0817	0788	0760	0731	0703	7
8	1056	1026	0995	0965	0935	0905	0876	0846	0817	0788	0759	0730	0702	8
9	1056	1025	0995	0965	0935	0905	0875	0846	0816	0787	0759	0730	0702	9
10	0.1055	1025	0994	0964	0934	0904	0875	0845	0816	0787	0758	0730	0701	10
11	1055	1024	0994	0964	0934	0904	0874	0845	0816	0787	0758	0729	0701	11
12	1054	1024	0993	0963	0933	0903	0874	0844	0815	0786	0757	0729	0700	12
13	1054	1023	0993	0963	0933	0903	0873	0844	0815	0786	0757	0728	0700	13
14	1053	1023	0992	0962	0932	0902	0873	0843	0814	0785	0756	0728	0699	14
15	0.1053	1022	0992	0962	0932	0902	0872	0843	0814	0785	0756	0727	0699	15
16	1052	1022	0991	0961	0931	0901	0872	0842	0813	0784	0755	0727	0698	16
17	1052	1021	0991	0961	0931	0901	0871	0842	0813	0784	0755	0726	0698	17
18	1051	1021	0990	0960	0930	0900	0871	0841	0812	0783	0754	0726	0697	18
19	1051	1020	0990	0960	0930	0900	0870	0841	0812	0783	0754	0725	0697	19
20	0.1050	1020	0989	0959	0929	0899	0870	0840	0811	0782	0753	0725	0696	20
21	1050	1019	0989	0959	0929	0899	0869	0840	0811	0782	0753	0724	0696	21
22	1049	1019	0988	0958	0928	0898	0869	0839	0810	0781	0752	0724	0695	22
23	1049	1018	0988	0958	0928	0898	0868	0839	0810	0781	0752	0723	0695	23
24	1048	1018	0987	0957	0927	0897	0868	0838	0809	0780	0751	0723	0694	24
25	0.1048	1017	0987	0957	0927	0897	0867	0838	0809	0780	0751	0722	0694	25
26	1047	1017	0986	0956	0926	0896	0867	0837	0808	0779	0751	0722	0694	26
27	1047	1016	0986	0956	0926	0896	0866	0837	0808	0779	0750	0721	0693	27
28	1046	1016	0985	0955	0925	0895	0866	0836	0807	0778	0750	0721	0693	28
29	1046	1015	0985	0955	0925	0895	0865	0836	0807	0778	0749	0721	0692	29
30	0.1045	1015	0984	0954	0924	0894	0865	0835	0806	0777	0749	0720	0692	30
31	1045	1014	0984	0954	0924	0894	0864	0835	0806	0777	0748	0720	0691	31
32	1044	1014	0983	0953	0923	0893	0864	0834	0805	0776	0748	0719	0691	32
33	1044	1013	0983	0953	0923	0893	0863	0834	0805	0776	0747	0719	0690	33
34	1043	1013	0982	0952	0922	0892	0863	0834	0804	0775	0747	0718	0690	34
35	0.1043	1012	0982	0952	0922	0892	0862	0833	0804	0775	0746	0718	0689	35
36	1042	1012	0981	0951	0921	0891	0862	0833	0803	0774	0746	0717	0689	36
37	1042	1011	0981	0951	0921	0891	0861	0832	0803	0774	0745	0717	0688	37
38	1041	1011	0980	0950	0920	0890	0861	0832	0802	0774	0745	0716	0688	38
39	1041	1010	0980	0950	0920	0890	0860	0831	0802	0773	0744	0716	0687	39
40	0.1040	1009	0979	0949	0919	0889	0860	0831	0801	0773	0744	0715	0687	40
41	1040	1009	0979	0949	0919	0889	0859	0830	0801	0772	0743	0715	0686	41
42	1039	1008	0978	0948	0918	0888	0859	0830	0801	0772	0743	0714	0686	42
43	1039	1008	0978	0948	0918	0888	0858	0829	0800	0771	0742	0714	0686	43
44	1038	1007	0977	0947	0917	0887	0858	0829	0800	0771	0742	0713	0685	44
45	0.1037	1007	0977	0947	0917	0887	0857	0828	0799	0770	0741	0713	0685	45
46	1037	1006	0976	0946	0916	0886	0857	0828	0799	0770	0741	0712	0684	46
47	1036	1006	0976	0946	0916	0886	0856	0827	0798	0769	0740	0712	0684	47
48	1036	1005	0975	0945	0915	0885	0856	0827	0798	0769	0740	0711	0683	48
49	1035	1005	0975	0945	0915	0885	0855	0826	0797	0768	0740	0711	0683	49
50	0.1035	1004	0974	0944	0914	0884	0855	0826	0797	0768	0739	0711	0682	50
51	1034	1004	0974	0944	0914	0884	0855	0825	0796	0767	0739	0710	0682	51
52	1034	1003	0973	0943	0913	0883	0854	0825	0796	0767	0738	0710	0681	52
53	1033	1003	0973	0943	0913	0883	0854	0824	0795	0766	0738	0709	0681	53
54	1033	1002	0972	0942	0912	0883	0853	0824	0795	0766	0737	0709	0680	54
55	0.1032	1002	0972	0942	0912	0882	0853	0823	0794	0765	0737	0708	0680	55
56	1032	1001	0971	0941	0911	0882	0852	0823	0794	0765	0736	0708	0679	56
57	1031	1001	0971	0941	0911	0881	0852	0822	0793	0764	0736	0707	0679	57
58	1031	1000	0970	0940	0910	0881	0851	0822	0793	0764	0735	0707	0678	58
59	1030	1000	0970	0940	0910	0880	0851	0821	0792	0763	0735	0706	0678	59
	2 21	2 22	2 23	2 24	2 25	2 26	2 27	2 28	2 29	2 30	2 31	2 32	2 33	

Proportional Logarithms.

" s.	° ′ h. m. 2 34	h. m. 2 35	h. m. 2 36	h. m. 2 37	h. m. 2 38	h. m. 2 39	h. m. 2 40	h. m. 2 41	h. m. 2 42	h. m. 2 43	h. m. 2 44	h. m. 2 45	h. m. 2 46	" s.
0	0.0678	0649	0621	0594	0566	0539	0512	0484	0458	0431	0404	0378	0352	0
1	0677	0649	0621	0593	0566	0538	0511	0484	0457	0430	0404	0377	0351	1
2	0677	0648	0621	0593	0565	0538	0511	0484	0457	0430	0403	0377	0351	2
3	0676	0648	0620	0592	0565	0537	0510	0483	0456	0430	0403	0377	0350	3
4	0676	0648	0620	0592	0564	0537	0510	0483	0456	0429	0403	0376	0350	4
5	0.0675	0647	0619	0591	0564	0536	0509	0482	0455	0429	0402	0376	0349	5
6	0675	0647	0619	0591	0563	0536	0509	0482	0455	0428	0402	0375	0349	6
7	0674	0646	0618	0591	0563	0536	0508	0481	0454	0428	0401	0375	0349	7
8	0674	0646	0618	0590	0562	0535	0508	0481	0454	0427	0401	0374	0348	8
9	0673	0645	0617	0590	0562	0535	0507	0480	0454	0427	0400	0374	0348	9
10	0.0673	0645	0617	0589	0562	0534	0507	0480	0453	0426	0400	0374	0347	10
11	0672	0644	0616	0589	0561	0534	0507	0480	0453	0426	0399	0373	0347	11
12	0672	0644	0616	0588	0561	0533	0506	0479	0452	0426	0399	0373	0346	12
13	0671	0643	0615	0588	0560	0533	0506	0479	0452	0425	0399	0372	0346	13
14	0671	0643	0615	0587	0560	0532	0505	0478	0451	0425	0398	0372	0346	14
15	0.0670	0642	0615	0587	0559	0532	0505	0478	0451	0424	0398	0371	0345	15
16	0670	0642	0614	0586	0559	0531	0504	0477	0450	0424	0397	0371	0345	16
17	0670	0641	0614	0586	0558	0531	0504	0477	0450	0423	0397	0370	0344	17
18	0669	0641	0613	0585	0558	0531	0503	0476	0450	0423	0396	0370	0344	18
19	0669	0641	0613	0585	0557	0530	0503	0476	0449	0422	0396	0370	0343	19
20	0.0668	0640	0612	0585	0557	0530	0502	0475	0449	0422	0395	0369	0343	20
21	0668	0640	0612	0584	0557	0529	0502	0475	0448	0422	0395	0369	0342	21
22	0667	0639	0611	0584	0556	0529	0502	0475	0448	0421	0395	0368	0342	22
23	0667	0639	0611	0583	0556	0528	0501	0474	0447	0421	0394	0368	0342	23
24	0666	0638	0610	0583	0555	0528	0501	0474	0447	0420	0394	0367	0341	24
25	0.0666	0638	0610	0582	0555	0527	0500	0473	0446	0420	0393	0367	0341	25
26	0665	0637	0609	0582	0554	0527	0500	0473	0446	0419	0393	0366	0340	26
27	0665	0637	0609	0581	0554	0526	0499	0472	0446	0419	0392	0366	0340	27
28	0664	0636	0609	0581	0553	0526	0499	0472	0445	0418	0392	0366	0339	28
29	0664	0636	0608	0580	0553	0526	0498	0471	0445	0418	0392	0365	0339	29
30	0.0663	0635	0608	0580	0552	0525	0498	0471	0444	0418	0391	0365	0339	30
31	0663	0635	0607	0579	0552	0525	0498	0471	0444	0417	0391	0364	0338	31
32	0663	0634	0607	0579	0552	0524	0497	0470	0443	0417	0390	0364	0338	32
33	0662	0634	0606	0579	0551	0524	0497	0470	0443	0416	0390	0363	0337	33
34	0662	0634	0606	0578	0551	0523	0496	0469	0442	0416	0389	0363	0337	34
35	0.0661	0633	0605	0578	0550	0523	0496	0469	0442	0415	0389	0363	0336	35
36	0661	0633	0605	0577	0550	0522	0495	0468	0442	0415	0388	0362	0336	36
37	0660	0632	0604	0577	0549	0522	0495	0468	0441	0414	0388	0362	0336	37
38	0660	0632	0604	0576	0549	0521	0494	0467	0441	0414	0388	0361	0335	38
39	0659	0631	0603	0576	0548	0521	0494	0467	0440	0414	0387	0361	0335	39
40	0.0659	0631	0603	0575	0548	0521	0493	0466	0440	0413	0387	0360	0334	40
41	0658	0630	0602	0575	0547	0520	0493	0466	0439	0413	0386	0360	0334	41
42	0658	0630	0602	0574	0547	0520	0493	0466	0439	0412	0386	0359	0333	42
43	0657	0629	0602	0574	0546	0519	0492	0465	0438	0412	0385	0359	0333	43
44	0657	0629	0601	0573	0546	0519	0492	0465	0438	0411	0385	0359	0333	44
45	0.0656	0628	0601	0573	0546	0518	0491	0464	0438	0411	0384	0358	0332	45
46	0656	0628	0600	0573	0545	0518	0491	0464	0437	0410	0384	0358	0332	46
47	0655	0628	0600	0572	0545	0517	0490	0463	0437	0410	0384	0357	0331	47
48	0655	0627	0599	0572	0544	0517	0490	0463	0436	0410	0383	0357	0331	48
49	0655	0627	0599	0571	0544	0517	0489	0462	0436	0409	0383	0356	0330	49
50	0.0654	0626	0598	0571	0543	0516	0489	0462	0435	0409	0382	0356	0330	50
51	0654	0626	0598	0570	0543	0516	0489	0462	0435	0408	0382	0356	0329	51
52	0653	0625	0597	0570	0542	0515	0488	0461	0434	0408	0381	0355	0329	52
53	0653	0625	0597	0569	0542	0515	0488	0461	0434	0407	0381	0355	0329	53
54	0652	0624	0596	0569	0541	0514	0487	0460	0434	0107	0381	0354	0328	54
55	0.0652	0624	0596	0568	0541	0514	0487	0460	0433	0406	0380	0354	0328	55
56	0651	0623	0596	0568	0541	0513	0486	0459	0433	0406	0380	0353	0327	56
57	0651	0623	0595	0568	0540	0513	0486	0459	0432	0406	0379	0353	0327	57
58	0650	0622	0595	0567	0540	0512	0485	0458	0432	0405	0379	0353	0326	58
59	0650	0622	0594	0567	0539	0512	0485	0458	0431	0405	0378	0352	0326	59
	2 34	2 35	2 36	2 37	2 38	2 39	2 40	2 41	2 42	2 43	2 44	2 45	2 46	

Proportional Logarithms.

″	° h. m. 2 47	° h. m. 2 48	° h. m. 2 49	° h. m. 2 50	° h. m. 2 51	° h. m. 2 52	° h. m. 2 53	° h. m. 2 54	° h. m. 2 55	° h. m. 2 56	° h. m. 2 57	° h. m. 2 58	° h. m. 2 59	″
0	0.0326	0300	0274	0248	0223	0197	0172	0147	0122	0098	0073	0049	0024	0
1	0325	0299	0273	0248	0222	0197	0172	0147	0122	0097	0073	0048	0024	1
2	0325	0299	0273	0247	0222	0197	0171	0146	0122	0097	0072	0048	0023	2
3	0324	0298	0273	0247	0221	0196	0171	0146	0121	0096	0072	0047	0023	3
4	0324	0298	0272	0247	0221	0196	0171	0146	0121	0096	0071	0047	0023	4
5	0.0323	0297	0272	0246	0221	0195	0170	0145	0120	0096	0071	0046	0022	5
6	0323	0297	0271	0246	0220	0195	0170	0145	0120	0095	0071	0046	0022	6
7	0323	0297	0271	0245	0220	0194	0169	0144	0119	0095	0070	0046	0021	7
8	0322	0296	0270	0245	0219	0194	0169	0144	0119	0094	0070	0045	0021	8
9	0322	0296	0270	0244	0219	0194	0169	0143	0119	0094	0069	0045	0021	9
10	0.0321	0295	0270	0244	0219	0193	0168	0143	0118	0093	0069	0044	0020	10
11	0321	0295	0269	0244	0218	0193	0168	0143	0118	0093	0068	0044	0020	11
12	0320	0294	0269	0243	0218	0192	0167	0142	0117	0093	0068	0044	0019	12
13	0320	0294	0268	0243	0217	0192	0167	0142	0117	0092	0068	0043	0019	13
14	0319	0294	0268	0242	0217	0192	0166	0141	0117	0092	0067	0043	0019	14
15	0.0319	0293	0267	0242	0216	0191	0166	0141	0116	0091	0067	0042	0018	15
16	0319	0293	0267	0241	0216	0191	0166	0141	0116	0091	0066	0042	0018	16
17	0318	0292	0267	0241	0216	0190	0165	0140	0115	0091	0066	0042	0017	17
18	0318	0292	0266	0241	0215	0190	0165	0140	0115	0090	0066	0041	0017	18
19	0317	0291	0266	0240	0215	0189	0164	0139	0114	0090	0065	0041	0017	19
20	0.0317	0291	0265	0240	0214	0189	0164	0139	0114	0089	0065	0040	0016	20
21	0316	0291	0265	0239	0214	0189	0163	0139	0114	0089	0064	0040	0016	21
22	0316	0290	0264	0239	0213	0188	0163	0138	0113	0089	0064	0040	0015	22
23	0316	0290	0264	0238	0213	0188	0163	0138	0113	0088	0064	0039	0015	23
24	0315	0289	0264	0238	0213	0187	0162	0137	0112	0088	0063	0039	0015	24
25	0.0315	0289	0263	0238	0212	0187	0162	0137	0112	0087	0063	0038	0014	25
26	0314	0288	0263	0237	0212	0187	0161	0136	0112	0087	0062	0038	0014	26
27	0314	0288	0262	0237	0211	0186	0161	0136	0111	0087	0062	0038	0013	27
28	0313	0288	0262	0236	0211	0186	0161	0136	0111	0086	0062	0037	0013	28
29	0313	0287	0261	0236	0211	0185	0160	0135	0110	0086	0061	0037	0012	29
30	0.0313	0287	0261	0235	0210	0185	0160	0135	0110	0085	0061	0036	0012	30
31	0312	0286	0261	0235	0210	0184	0159	0134	0110	0085	0060	0036	0012	31
32	0312	0286	0260	0235	0209	0184	0159	0134	0109	0084	0060	0036	0011	32
33	0311	0285	0260	0234	0209	0184	0158	0134	0109	0084	0060	0035	0011	33
34	0311	0285	0259	0234	0208	0183	0158	0133	0108	0084	0059	0035	0010	34
35	0.0310	0285	0259	0233	0208	0183	0158	0133	0108	0083	0059	0034	0010	35
36	0310	0284	0258	0233	0208	0182	0157	0132	0107	0083	0058	0034	0010	36
37	0310	0284	0258	0233	0207	0182	0157	0132	0107	0082	0058	0034	0009	37
38	0309	0283	0258	0232	0207	0181	0156	0131	0107	0082	0057	0033	0009	38
39	0309	0283	0257	0232	0206	0181	0156	0131	0106	0082	0057	0033	0008	39
40	0.0308	0282	0257	0231	0206	0181	0156	0131	0106	0081	0057	0032	0008	40
41	0308	0282	0256	0231	0205	0180	0155	0130	0105	0081	0056	0032	0008	41
42	0307	0282	0256	0230	0205	0180	0155	0130	0105	0080	0056	0031	0007	42
43	0307	0281	0255	0230	0205	0179	0154	0129	0105	0080	0055	0031	0007	43
44	0307	0281	0255	0230	0204	0179	0154	0129	0104	0080	0055	0031	0006	44
45	0.0306	0280	0255	0229	0204	0179	0153	0129	0104	0079	0055	0030	0006	45
46	0306	0280	0254	0229	0203	0178	0153	0128	0103	0079	0054	0030	0006	46
47	0305	0279	0254	0228	0203	0178	0153	0128	0103	0078	0054	0029	0005	47
48	0305	0279	0253	0228	0202	0177	0152	0127	0103	0078	0053	0029	0005	48
49	0304	0279	0253	0227	0202	0177	0152	0127	0102	0077	0053	0029	0004	49
50	0.0304	0278	0252	0227	0202	0176	0151	0126	0102	0077	0053	0028	0004	50
51	0304	0278	0252	0227	0201	0176	0151	0126	0101	0077	0052	0028	0004	51
52	0303	0277	0252	0226	0201	0176	0151	0126	0101	0076	0052	0027	0003	52
53	0303	0277	0251	0226	0200	0175	0150	0125	0100	0076	0051	0027	0003	53
54	0302	0276	0251	0225	0200	0175	0150	0125	0100	0075	0051	0027	0002	54
55	0.0302	0276	0250	0225	0200	0174	0149	0124	0100	0075	0051	0026	0002	55
56	0301	0276	0250	0224	0199	0174	0149	0124	0099	0075	0050	0026	0002	56
57	0301	0275	0250	0224	0199	0174	0148	0124	0099	0074	0050	0025	0001	57
58	0300	0275	0249	0224	0198	0173	0148	0123	0098	0074	0049	0025	0001	58
59	0300	0274	0249	0223	0198	0173	0148	0123	0098	0073	0049	0025	0000	59
	2 47	2 48	2 49	2 50	2 51	2 52	2 53	2 54	2 55	2 56	2 57	2 58	2 59	

Corrections of the Apparent Altitudes of the Sun and Stars.

Alt.	⊙'s Corr.	*'s Corr	Diff. to 10′	Alt.	⊙'s Corr.	*'s Corr.	Alt.	⊙'s Corr.	*'s Corr.	Alt.	⊙'s Corr.	*'s Corr.	Alt.	⊙'s Corr.	*'s Corr.
° ′	′ ″	′ ″	″	° ′	′ ″	′ ″	° ′	′ ″	′ ″	° ′	′ ″	′ ″	° ′	′ ″	′ ″
0. 0	32.51	33. 0	38	10. 0	5. 6	5.15	20. 0	2.28	2.36	30. 6	1.31	1.39	50. 0	0.42	0.48
10	31.13	31.22	92	10	5. 1	5 10	10	2.27	2.35	20	1.29	1.37	30	.42	.47
20	29.41	29.50	87	20	4.56	5. 5	20	2.25	2.33	40	1.28	1.36	51. 0	.41	.46
30	28.14	28.23	83	30	4.51	5. 0	30	2.24	2.32	31. 0	1.27	1.35	30	.40	.46
40	26.51	27. 0	78	40	4.47	4.56	40	2.22	2.30	20	1.26	1.33	52. 0	.39	.45
50	25.33	25.42	73	50	4.42	4 51	50	2.21	2.29	40	1.25	1.32	30	.39	.44
1. 0	24.20	24.29	69	11. 0	4.38	4.47	21. 0	2.19	2.27	32. 0	1.24	1.31	53. 0	.38	.43
10	23.11	23.20	65	10	4.34	4.43	10	2.18	2.26	20	1.23	1.30	30	.37	.42
20	22. 6	22.15	61	20	4.30	4.39	20	2.17	2.25	40	1.22	1.29	54. 0	.36	.41
30	21. 5	21.14	56	30	4.26	4.35	30	2.15	2.23	33. 0	1.21	1.28	30	.36	.41
40	20. 9	20.18	53	40	4 22	4.31	40	2.14	2.22	20	1.19	1.26	55. 0	.35	.40
50	19.16	19.25	50	50	4.18	4.27	50	2.13	2.21	40	1.18	1.25	30	.34	.39
2. 0	18.26	18.35	47	12. 0	4.14	4.23	22. 0	2.12	2.20	34. 0	1.17	1.24	56. 0	.33	.38
10	17.39	17.48	44	10	4.11	4.20	10	2.11	2.19	20	1.16	1.23	30	.33	.38
20	16.55	17. 4	41	20	4. 7	4.16	20	2.10	2.18	40	1.15	1.22	57. 0	.32	.37
30	16.14	16.23	38	30	4. 4	4.13	30	2. 9	2.17	35. 0	1.14	1.21	30	.32	.37
40	15.36	15.45	36	40	4. 1	4.10	40	2. 8	2.16	20	1.13	1.20	58. 0	.31	.36
50	15. 0	15. 9	34	50	3.57	4. 6	50	2. 7	2.15	40	1.12	1.19	30	.31	.35
3. 0	14.27	14.36	32	13. 0	3.54	4. 3	23. 0	2. 6	2.14	36. 0	1.11	1.18	59. 0	.30	.34
10	13.55	14. 4	30	10	3.51	4. 0	10	2. 5	2.13	20	1.10	1.17	30	.30	.34
20	13.25	13.34	28	20	3.48	3.57	20	2. 4	2.12	40	1.10	1.17	60. 0	.29	.33
30	12.57	13. 6	27	30	3.45	3.54	30	2. 3	2.11	37. 0	1. 9	1.16	30	.28	.33
40	12.30	12.39	25	40	3.42	3.51	40	2. 2	2.10	20	1. 8	1.15	61. 0	.27	.32
50	12. 5	12.14	24	50	3.39	3.48	50	2. 1	2. 9	40	1. 7	1.14	30	.27	.31
4. 0	11.41	11.50	22	14. 0	3.37	3.46	24. 0	2. 0	2. 8	38. 0	1. 6	1.13	62. 0	.26	.30
10	11.19	11.28	21	10	3.34	3.43	10	1.59	2. 7	20	1. 5	1.12	30	.26	.30
20	10.58	11. 7	20	20	3.31	3.40	20	1.58	2. 6	40	1. 4	1.11	63. 0	.25	.29
30	10.38	10.47	19	30	3.29	3.38	30	1.57	2. 5	39. 0	1. 3	1.10	30	.25	.29
40	10.19	10.28	18	40	3.26	3.35	40	1.56	2. 4	20	1. 2	1. 9	64. 0	.24	.28
50	10. 1	10.10	17	50	3.24	3.33	50	1.55	2. 3	40	1. 1	1. 8	30	.24	.28
5. 0	9.44	9.53	16	15. 0	3.21	3.30	25. 0	1.54	2. 2	40. 0	1. 1	1. 8	65. 0	.23	.27
10	9.28	9.37	15	10	3.19	3.28	10	1.53	2. 1	20	1. 0	1. 7	30	.23	.26
20	9.13	9.22	15	20	3.17	3.26	20	1.52	2. 0	40	1. 0	1. 6	66. 0	.22	.25
30	8.58	9. 7	14	30	3.15	3.24	30	1.51	1.59	41. 0	.59	1. 5	30	.22	.25
40	8.44	8.53	13	40	3.12	3.21	40	1.50	1.58	20	.58	1. 4	67. 0	.21	.24
50	8.31	8.40	13	50	3.10	3.19	50	1.49	1.57	40	.57	1. 3	30	.21	.24
6. 0	8.18	8.27	12	16. 0	3. 8	3.17	26. 0	1.48	1.56	42. 0	.57	1. 3	68. 0	.20	.23
10	8. 6	8.15	12	10	3. 6	3.15	10	1.47	1.55	20	.56	1. 2	30	.20	.23
20	7.54	8. 3	11	20	3. 4	3.13	20	1.46	1.54	40	.56	1. 1	69. 0	.19	.22
30	7.43	7.52	11	30	3. 2	3.11	30	1.45	1.53	43. 0	.55	1. 1	70. 0	.18	.21
40	7.32	7.41	10	40	3. 0	3. 9	40	1.45	1.53	20	.55	1. 0	71. 0	.17	.20
50	7.22	7.31	10	50	2.58	3. 7	50	1.44	1.52	40	.54	1. 0	72. 0	.16	.19
7. 0	7.12	7.21	9	17. 0	2.56	3. 5	27. 0	1.43	1.51	44. 0	.53	.59	73. 0	.15	.17
10	7. 3	7.12	9	10	2.54	3. 3	10	1.42	1.50	20	.53	.58	74. 0	.14	.16
20	6.54	7. 3	9	20	2.52	3. 1	20	1.42	1.50	40	.52	.58	75. 0	.13	.15
30	6.45	6.54	8	30	2.50	2.59	30	1.41	1.49	45. 0	.51	.57	76. 0	.12	.14
40	6.37	6.46	8	40	2.49	2.58	40	1.41	1.49	20	.51	.57	77. 0	.11	.13
50	6.29	6.38	8	50	2.47	2.56	50	1.40	1.48	40	.50	.56	78. 0	.10	.12
8. 0	6.21	6.30	8	18. 0	2.45	2.54	28. 0	1.39	1.47	46. 0	.49	.55	79. 0	. 9	.11
10	6.13	6.22	7	10	2.43	2.52	10	1.38	1.46	20	.49	.55	80. 0	. 8	.10
20	6. 6	6.15	7	20	2.42	2.51	20	1.38	1.46	40	.48	.54	81. 0	. 8	. 9
30	5.59	6. 8	7	30	2.40	2.49	30	1.37	1.45	47. 0	.47	.53	82. 0	. 7	. 8
40	5.52	6. 1	6	40	2.38	2.47	40	1.37	1.45	20	.47	.53	83. 0	. 6	. 7
50	5.46	5.55	6	50	2.37	2.46	50	1.36	1.44	40	.46	.52	84. 0	. 5	. 6
9. 0	5.40	5.49	6	19. 0	2.36	2.44	29. 0	1.35	1.43	48. 0	.45	.51	85. 0	. 4	. 5
10	5.34	5.43	6	10	2.35	2.43	10	1.34	1.42	20	.45	.51	86. 0	. 3	. 4
20	5.28	5.37	6	20	2.33	2.41	20	1.34	1.42	40	.44	.50	87. 0	. 3	. 3
30	5.22	5.31	5	30	2.32	2.40	30	1.33	1.41	49. 0	.44	.50	88. 0	. 2	. 2
40	5.17	5.26	5	40	2.31	2.39	40	1.32	1.40	20	.43	.49	89. 0	. 1	. 1
50	5.12	5.21		50	2.29	2.37	50	1.32	1.40	40	.43	.49	90. 0	. 0	. 0

TABLE XXI.

Correction of the Moon's Apparent Altitude.

☽'s App. Alt.	Moon's Horizontal Parallax.																Add for Seconds of Parallax.										Add for Minutes of Alt.	
	54′		55′		56′		57′		58′		59′		60′		61′			0″	1″	2″	3″	4″	5″	6″	7″	8″	9″		
	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	″	″	″	″	″	″	″	″	″	″	″		
3° 0′	39	21	40	20	41	20	42	20	43	20	44	20	45	20	46	20	0	0	1	2	3	4	5	6	7	8	9		
10	39	52	40	52	41	52	42	52	43	51	44	51	45	51	46	51	10	10	11	12	13	14	15	16	17	18	19	0′	0″
20	40	21	41	21	42	21	43	21	44	21	45	21	46	21	47	20	20	20	21	22	23	24	25	26	27	28	29	1	2
30	40	49	41	49	42	48	43	48	44	48	45	48	46	48	47	48	30	30	31	32	33	34	35	36	37	38	39	2	5
40	41	15	42	14	43	14	44	14	45	14	46	14	47	14	48	14	40	40	41	42	43	44	45	46	47	48	49	3	7
50	41	39	42	39	43	39	44	39	45	38	46	38	47	38	48	38	50	50	51	52	53	54	55	56	57	58	59	4	9
4° 0′	42	2	43	2	44	2	45	1	46	1	47	1	48	1	49	1	0	0	1	2	3	4	5	6	7	8	9	5	11
10	42	24	43	23	44	23	45	23	46	23	47	23	48	23	49	22	10	10	11	12	13	14	15	16	17	18	19	6	14
20	42	44	43	44	44	44	45	43	46	43	47	43	48	43	49	43	20	20	21	22	23	24	25	26	27	28	29	7	16
30	43	3	44	3	45	3	46	3	47	2	48	2	49	2	50	2	30	30	31	32	33	34	35	36	37	38	39	8	18
40	43	21	44	21	45	21	46	21	47	21	48	20	49	20	50	20	40	40	41	42	43	44	45	46	47	48	49	9	21
50	43	39	44	38	45	38	46	38	47	38	48	37	49	37	50	37	50	50	51	52	53	54	55	56	57	58	59		
5° 0′	43	55	44	54	45	54	46	54	47	54	48	54	49	53	50	53	0	0	1	2	3	4	5	6	7	8	9		
10	44	10	45	10	46	10	47	9	48	9	49	9	50	9	51	8	10	10	11	12	13	14	15	16	17	18	19	0′	0″
20	44	25	45	24	46	24	47	24	48	24	49	23	50	23	51	23	20	20	21	22	23	24	25	26	27	28	29	1	1
30	44	38	45	38	46	38	47	38	48	37	49	37	50	37	51	36	30	30	31	32	33	34	35	36	37	38	39	2	2
40	44	51	45	51	46	51	47	51	48	50	49	50	50	50	51	49	40	40	41	42	43	44	45	46	47	48	49	3	4
50	45	4	46	3	47	3	48	3	49	3	50	2	51	2	52	2	50	50	51	52	53	54	55	56	57	58	59	4	5
6° 0′	45	16	46	15	47	15	48	15	49	14	50	14	51	14	52	13	0	0	1	2	3	4	5	6	7	8	9	5	6
10	45	27	46	26	47	26	48	26	49	25	50	25	51	25	52	24	10	10	11	12	13	14	15	16	17	18	19	6	7
20	45	37	46	37	47	37	48	36	49	36	50	35	51	35	52	35	20	20	21	22	23	24	25	26	27	28	29	7	8
30	45	47	46	47	47	47	48	46	49	46	50	45	51	45	52	45	30	30	31	32	33	34	35	36	37	38	39	8	9
40	45	57	46	57	47	56	48	56	49	55	50	55	51	55	52	54	40	40	41	42	43	44	45	46	47	48	49	9	11
50	46	6	47	6	48	5	49	5	50	4	51	4	52	4	53	3	50	50	51	52	53	54	55	56	57	58	59		
7° 0′	46	15	47	14	48	14	49	13	50	13	51	13	52	12	53	12	0	0	1	2	3	4	5	6	7	8	9		
10	46	23	47	22	48	22	49	21	50	21	51	21	52	20	53	20	10	10	11	12	13	14	15	16	17	18	19	0′	0″
20	46	31	47	30	48	30	49	29	50	29	51	28	52	28	53	27	20	20	21	22	23	24	25	26	27	28	29	1	1
30	46	38	47	38	48	37	49	37	50	36	51	36	52	35	53	35	30	30	31	32	33	34	35	36	37	38	39	2	1
40	46	45	47	45	48	44	49	44	50	43	51	43	52	42	53	42	40	40	41	42	43	44	45	46	47	48	49	3	2
50	46	52	47	52	48	51	49	51	50	50	51	49	52	49	53	48	50	50	51	52	53	54	55	56	57	58	59	4	3
8° 0′	46	59	47	58	48	58	49	57	50	56	51	56	52	55	53	55	0	0	1	2	3	4	5	6	7	8	9	5	3
10	47	5	48	4	49	4	50	3	51	2	52	2	53	1	54	1	10	10	11	12	13	14	15	16	17	18	19	6	4
20	47	11	48	10	49	9	50	9	51	8	52	8	53	7	54	6	20	20	21	22	23	24	25	26	27	28	29	7	4
30	47	16	48	16	49	15	50	14	51	14	52	13	53	12	54	12	30	30	31	32	33	34	35	36	37	38	39	8	5
40	47	22	48	21	49	20	50	20	51	19	52	18	53	17	54	17	40	40	41	42	43	44	45	46	47	48	49	9	6
50	47	27	48	26	49	25	50	25	51	24	52	23	53	22	54	22	50	50	51	52	53	54	55	56	57	58	59		
9° 0′	47	31	48	31	49	30	50	29	51	29	52	28	53	27	54	26	0	0	1	2	3	4	5	6	7	8	9		
10	47	36	48	35	49	35	50	34	51	33	52	32	53	31	54	31	10	10	11	12	13	14	15	16	17	18	19	0′	0″
20	47	40	48	39	49	39	50	38	51	37	52	36	53	35	54	35	20	20	21	22	23	24	25	26	27	28	29	1	0
30	47	44	48	44	49	43	50	42	51	41	52	40	53	39	54	39	30	30	31	32	33	34	35	36	37	38	39	2	1
40	47	48	48	47	49	47	50	46	51	45	52	44	53	43	54	43	40	39	40	41	42	43	44	45	46	47	48	3	1
50	47	52	48	51	49	50	50	50	51	49	52	48	53	47	54	46	50	49	50	51	52	53	54	55	56	57	58	4	1
10° 0′	47	56	48	55	49	54	50	53	51	52	52	51	53	50	54	49	0	0	1	2	3	4	5	6	7	8	9	5	2
10	47	59	48	58	49	57	50	56	51	55	52	54	53	53	54	52	10	10	11	12	13	14	15	16	17	18	19	6	2
20	48	2	49	1	50	0	50	59	51	58	52	57	53	56	54	55	20	20	21	22	23	24	25	26	27	28	29	7	2
30	48	5	49	4	50	3	51	2	52	1	53	0	53	59	54	58	30	29	30	31	32	33	34	35	36	37	38	8	2
40	48	8	49	7	50	6	51	5	52	4	53	3	54	2	55	1	40	39	40	41	42	43	44	45	46	47	48	9	3
50	48	11	49	10	50	9	51	8	52	7	53	6	54	4	55	3	50	49	50	51	52	53	54	55	56	57	58		
11° 0′	48	13	49	12	50	11	51	10	52	9	53	8	54	7	55	6	0	0	1	2	3	4	5	6	7	8	9		
10	48	16	49	15	50	14	51	12	52	11	53	10	54	9	55	8	10	10	11	12	13	14	15	16	17	18	19	0′	0″
20	48	18	49	17	50	16	51	14	52	13	53	12	54	11	55	10	20	20	21	22	23	24	24	25	26	27	28	1	0
30	48	20	49	19	50	18	51	16	52	15	53	14	54	13	55	12	30	29	30	31	32	33	34	35	36	37	38	2	0
40	48	22	49	21	50	20	51	18	52	17	53	16	54	15	55	14	40	39	40	41	42	43	44	45	46	47	48	3	1
50	48	24	49	23	50	22	51	20	52	19	53	18	54	16	55	16	50	49	50	51	52	53	54	55	56	57	58	4	1
12° 0′	48	26	49	25	50	23	51	22	52	21	53	19	54	18	55	17	0	0	1	2	3	4	5	6	7	8	9	5	1
10	48	27	49	26	50	25	51	23	52	22	53	21	54	19	55	18	10	10	11	12	13	14	15	16	17	18	19	6	1
20	48	29	49	28	50	26	51	25	52	23	53	22	54	21	55	19	20	20	21	21	22	23	24	25	26	27	28	7	1
30	48	30	49	29	50	27	51	26	52	25	53	23	54	22	55	20	30	29	30	31	32	33	34	35	36	37	38	8	1
40	48	32	49	30	50	29	51	27	52	26	53	24	54	23	55	21	40	39	40	41	42	43	44	45	46	47	48	9	2
50	48	33	49	31	50	30	51	28	52	27	53	25	54	24	55	22	50	49	50	51	52	53	54	55	56	57	58		

TABLE XXII.

Logarithms of the Moon's Apparent Altitude.

☽'s App. Alt.	Moon's Horizontal Parallax.								Add for Seconds of Parallax.											Add for Minutes of Alt.
	54′	55′	56′	57′	58′	59′	60′	61′	″	0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	
3° 0′	4.300761	0753	0745	0736	0728	0720	0712	0704	0	50	50	50	50	49	49	49	49	49	49	
10	0742	0734	0725	0716	0708	0699	0691	0682	10	48	48	48	48	48	48	47	47	47	47	0′ 20
20	0723	0714	0705	0696	0687	0678	0669	0660	20	47	47	46	46	46	46	46	46	46	45	1 18
30	0704	0694	0685	0676	0666	0657	0647	0638	30	45	45	45	45	45	44	44	44	44	44	2 16
40	0684	0675	0665	0656	0646	0636	0627	0617	40	44	43	43	43	43	43	43	42	42	42	3 14
50	0665	0655	0645	0635	0625	0615	0605	0595	50	42	42	42	42	41	41	41	41	41	41	4 12
4° 0′	4.300646	0636	0625	0615	0605	0594	0583	0573	0	50	50	50	49	49	49	49	49	48	48	5 10
10	0627	0616	0605	0594	0584	0573	0562	0551	10	48	48	48	47	47	47	47	47	46	46	6 8
20	0607	0596	0585	0574	0563	0551	0540	0528	20	46	46	46	46	45	45	45	45	44	44	7 6
30	0588	0576	0564	0553	0541	0529	0518	0506	30	44	44	44	44	43	43	43	43	43	42	8 4
40	0568	0556	0544	0532	0520	0507	0496	0484	40	42	42	42	42	41	41	41	41	41	40	9 1
50	0548	0536	0524	0511	0499	0486	0474	0462	50	40	40	40	40	39	39	39	39	39	39	
5° 0′	4.300529	0517	0504	0491	0479	0466	0453	0440	0	50	50	50	49	49	49	49	48	48	48	
10	0509	0496	0483	0470	0457	0444	0431	0418	10	48	47	47	47	47	47	46	46	46	46	0′ 20
20	0490	0476	0463	0449	0436	0422	0409	0395	20	45	45	45	45	44	44	44	44	44	43	1 18
30	0470	0456	0443	0429	0415	0401	0387	0373	30	43	43	43	42	42	42	42	42	41	41	2 16
40	0450	0436	0422	0408	0393	0379	0365	0351	40	41	41	40	40	40	40	39	39	39	39	3 14
50	0431	0416	0401	0387	0372	0357	0343	0328	50	38	38	38	38	38	37	37	37	37	36	4 12
6° 0′	4.300411	0396	0381	0366	0351	0336	0321	0306	0	50	50	49	49	49	49	48	48	48	48	5 10
10	0391	0376	0360	0345	0330	0315	0299	0284	10	47	47	47	47	46	46	46	45	45	45	6 7
20	0371	0356	0340	0324	0309	0293	0277	0261	20	45	44	44	44	44	43	43	43	43	42	7 5
30	0351	0335	0319	0303	0287	0271	0255	0239	30	42	42	41	41	41	41	40	40	40	40	8 3
40	0332	0315	0299	0282	0266	0249	0233	0216	40	39	39	39	39	38	38	38	37	37	37	9 1
50	0312	0295	0278	0261	0245	0228	0211	0194	50	37	36	36	36	36	35	35	35	35	34	
7° 0′	4.300293	0275	0258	0241	0224	0207	0189	0172	0	50	50	49	49	49	48	48	48	48	47	
10	0273	0255	0238	0220	0202	0185	0167	0149	10	47	47	46	46	46	45	45	45	45	44	0′ 20
20	0253	0235	0217	0199	0181	0163	0145	0127	20	44	44	43	43	43	42	42	42	42	41	1 18
30	0233	0215	0196	0178	0160	0141	0123	0105	30	41	41	40	40	40	39	39	39	38	38	2 16
40	0213	0195	0176	0157	0139	0120	0101	0082	40	38	38	37	37	37	36	36	36	35	35	3 14
50	0194	0175	0156	0137	0118	0099	0079	0060	50	35	35	34	34	34	33	33	33	32	32	4 12
8° 0′	4.300174	0155	0136	0116	0097	0077	0058	0038	0	50	50	49	49	49	48	48	48	47	47	5 9
10	0155	0135	0115	0095	0076	0056	0036	0016	10	47	46	46	46	45	45	45	44	44	44	6 7
20	30/29 0135	0115	0095	0075	0055	0034	0014	9994	20	43	43	43	42	42	42	41	41	40	40	7 5
30	0115	0095	0075	0054	0034	0013	9993	9972	30	40	39	39	39	38	38	38	37	37	37	8 3
40	0096	0075	0054	0033	0012	9991	9971	9950	40	36	36	36	35	35	35	34	34	34	33	9 1
50	0076	0055	0034	0013	9991	9970	9949	9927	50	33	33	32	32	32	31	31	31	30	30	
9° 0′	4.	0056	0035	0013	9992	9970	9948	9927	9905	0	50	50	49	49	48	48	48	47	47	47
10	0037	0015	9993	9971	9949	9927	9905	9883	10	46	46	45	45	45	44	44	44	43	43	0′ 20
20	30/29 0017	9995	9972	9950	9928	9905	9883	9861	20	42	42	42	41	41	41	40	40	39	39	1 18
30	9998	9975	9952	9930	9907	9884	9862	9839	30	39	38	38	38	37	37	36	36	36	35	2 16
40	9978	9955	9932	9909	9886	9863	9840	9816	40	35	34	34	34	33	33	33	32	32	31	3 14
50	9958	9935	9911	9888	9865	9841	9818	9794	50	31	31	30	30	30	29	29	28	28	28	4 12
10° 0′	4. 299939	9915	9891	9867	9844	9820	9796	9772	0	50	50	49	49	48	48	48	47	47	46	5 9
10	9919	9895	9871	9847	9823	9799	9774	9750	10	46	45	45	45	44	44	43	43	43	42	6 7
20	9900	9875	9850	9826	9802	9777	9752	9728	20	42	41	41	40	40	40	39	39	38	38	7 5
30	9880	9855	9830	9805	9781	9756	9731	9706	30	38	37	37	36	36	35	35	35	34	34	8 3
40	9860	9835	9810	9784	9759	9734	9709	9683	40	33	33	33	32	32	31	31	30	30	30	9 1
50	9841	9815	9789	9764	9738	9713	9687	9661	50	29	29	28	28	28	27	27	26	26	26	
11° 0′	4.299821	9795	9769	9743	9717	9691	9665	9639	0	50	50	49	49	48	48	47	47	46	46	
10	9802	9775	9749	9723	9696	9670	9643	9617	10	45	45	45	44	44	43	43	42	42	41	0′ 20
20	9782	9755	9729	9702	9675	9649	9622	9595	20	41	41	40	40	39	39	38	38	37	37	1 18
30	9763	9736	9709	9682	9655	9628	9600	9573	30	36	36	36	35	35	34	34	33	33	32	2 16
40	9743	9716	9688	9661	9634	9606	9578	9551	40	32	31	31	31	30	30	29	29	28	28	3 14
50	9724	9696	9668	9641	9613	9585	9557	9529	50	27	27	27	26	26	25	25	24	24	23	4 12
12° 0′	4.299704	9676	9648	9620	9592	9564	9535	9507	0	50	50	49	49	48	48	47	47	46	46	5 10
10	9685	9656	9628	9600	9571	9542	9513	9485	10	45	45	44	44	43	43	42	42	41	41	6 8
20	9665	9636	9608	9579	9550	9521	9492	9463	20	40	40	39	39	38	38	37	37	36	36	7 5
30	9646	9617	9588	9559	9529	9500	9470	9441	30	35	35	34	34	33	33	32	32	31	31	8 3
40	9626	9597	9568	9538	9508	9478	9449	9419	40	30	30	30	29	29	28	28	27	27	26	9 1
50	9607	9577	9547	9517	9487	9457	9427	9397	50	26	25	25	24	24	23	23	22	22	21	

App. Alt. of ☉ or ✱	° 3	° 4	° 5	° 6	° 7	° 8	° 9	° 10	° 12	° 14	° 16	° 18	° 20	° 22	° 24	° 26	° 28	° 30	° 32	° 34	° 36	° 38	° 40	° 45	° 50	° 55	° 60	° 65	° 70	° 75	° 80	° 85	° 90
Add for ☉'s Alt.	2	11	16	19	21	22	23	23	24	24	24	24	23	22	22	21	21	21	0	0	19	19	19	18	17	16	15	14	13	13	12	12	11	11
Add for ✱'s Alt.	3	12	18	21	23	24	25	26	27	28	29	29	29	29	29	29	29	30	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30	30

TABLE XXI.

Correction of the Moon's Apparent Altitude.

☽'s App. Alt.	Moon's Horizontal Parallax.								Add for Seconds of Parallax.										Add for Minutes of Alt.	
	54′	55′	56′	57′	58′	59′	60′	61′		0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″	″	″	″	″	″	″	″	″	″	″	
13° 0′	48 34	49 32	50 31	51 29	52 28	53 26	54 25	55 23	0	0	1	2	3	4	5	6	7	8	9	
10	48 35	49 33	50 32	51 30	52 28	53 27	54 25	55 24	10	10	11	12	13	14	15	16	17	18	18	0′ 0″
20	48 36	49 34	50 32	51 31	52 29	53 28	54 26	55 24	20	19	20	21	22	23	24	25	26	27	28	1 0
30	48 36	49 35	50 33	51 31	52 30	53 28	54 26	55 25	30	29	30	31	32	33	34	35	36	37	38	2 0
40	48 37	49 35	50 34	51 32	52 30	53 29	54 27	55 25	40	39	40	41	42	43	44	45	46	47	48	3 0
50	48 38	49 36	50 34	51 32	52 31	53 29	54 27	55 25	50	49	50	51	52	53	53	54	55	56	57	4 0
14° 0′	48 38	49 36	50 35	51 33	52 31	53 29	54 27	55 26	0	0	1	2	3	4	5	6	7	8	9	5 0
10	48 39	49 37	50 35	51 33	52 31	53 29	54 28	55 26	10	10	11	12	13	14	15	15	16	17	18	6 0
20	48 39	49 37	50 35	51 33	52 31	53 30	54 28	55 26	20	19	20	21	22	23	24	25	26	27	28	7 0
30	48 39	49 37	50 35	51 33	52 31	53 30	54 28	55 26	30	29	30	31	32	33	34	35	36	37	38	8 0
40	48 39	49 37	50 35	51 33	52 31	53 30	54 28	55 26	40	39	40	41	42	43	44	45	46	46	47	9 0
50	48 39	49 37	50 35	51 33	52 31	53 29	54 27	55 25	50	48	49	50	51	52	53	54	55	56	57	
15° 0′	48 39	49 37	50 35	51 33	52 31	53 29	54 27	55 25	0	0	1	2	3	4	5	6	7	8	9	
10	48 39	49 37	50 35	51 33	52 31	53 29	54 27	55 25	10	10	11	12	13	14	14	15	16	17	18	0′ 0″
20	48 39	49 37	50 35	51 33	52 31	53 28	54 26	55 24	20	19	20	21	22	23	24	25	26	27	28	1 0
30	48 39	49 37	50 34	51 32	52 30	53 28	54 26	55 24	30	29	30	31	32	33	34	35	36	37	38	2 0
40	48 39	49 36	50 34	51 32	52 30	53 27	54 25	55 23	40	39	39	40	41	42	43	44	45	46	47	3 0
50	48 38	49 36	50 34	51 31	52 29	53 27	54 24	55 22	50	48	49	50	51	52	53	54	55	56	57	4 0
16° 0′	48 38	49 35	50 33	51 31	52 28	53 26	54 24	55 21	0	0	1	2	3	4	5	6	7	8	9	5 0
10	48 37	19 35	50 32	51 30	52 28	53 25	54 23	55 20	10	10	11	11	12	13	14	15	16	17	18	6 0
20	48 37	49 34	50 32	51 29	52 27	53 25	54 22	55 19	20	19	20	21	22	23	24	25	26	27	28	7 0
30	48 36	49 33	50 31	51 29	52 26	53 24	54 21	55 18	30	29	30	31	32	33	34	35	36	37	38	8 0
40	48 35	49 33	50 30	51 28	52 25	53 23	54 20	55 17	40	38	39	40	41	42	43	44	45	46	47	9 0
50	48 34	49 32	50 29	51 27	52 25	53 22	54 19	55 16	50	48	49	50	51	52	53	54	55	56	57	
17° 0′	48 24	49 21	50 18	51 16	52 13	53 11	54 8	55 5	0	0	1	2	3	4	5	6	7	8	9	
10	48 23	49 20	50 17	51 15	52 12	53 9	54 7	55 4	10	10	10	11	12	13	14	15	16	17	18	0′ 10″
20	48 22	49 19	50 16	51 14	52 11	53 8	54 5	55 3	20	19	20	21	22	23	24	25	26	27	28	1 10
30	48 21	49 18	50 15	51 12	52 10	53 7	54 4	55 1	30	29	30	30	31	32	33	34	35	36	37	2 10
40	48 20	49 17	50 14	51 11	52 8	53 6	54 3	55 0	40	38	39	40	41	42	43	44	45	46	47	3 10
50	48 19	49 16	50 13	51 10	52 7	53 4	54 1	54 58	50	48	49	50	51	52	52	53	54	55	56	4 10
18° 0′	48 17	49 14	50 12	51 9	52 6	53 3	54 0	54 57	0	0	1	2	3	4	5	6	7	8	9	5 9
10	48 16	49 13	50 10	51 7	52 4	53 1	53 58	54 55	10	9	10	11	12	13	14	15	16	17	18	6 9
20	48 15	49 12	50 9	51 6	52 3	53 0	53 57	54 54	20	19	20	21	22	23	24	25	26	27	27	7 9
30	48 13	49 10	50 7	51 4	52 1	52 58	53 55	54 52	30	28	29	30	31	32	33	34	35	36	37	8 9
40	48 12	49 9	50 6	51 3	51 59	52 56	53 53	54 50	40	38	39	40	41	42	43	44	45	46	46	9 9
50	48 11	49 7	50 4	51 1	51 58	52 55	53 51	54 48	50	47	48	49	50	51	52	53	54	55	56	
19° 0′	48 9	49 6	50 3	50 59	51 56	52 53	53 50	54 46	0	0	1	2	3	4	5	6	7	8	8	
10	48 8	49 4	50 1	50 58	51 54	52 51	53 48	54 44	10	9	10	11	12	13	14	15	16	17	18	0′ 10″
20	48 6	49 3	49 59	50 56	51 52	52 49	53 46	54 42	20	19	20	21	22	23	24	25	26	27	27	1 10
30	48 4	49 1	49 57	50 54	51 51	52 47	53 44	54 40	30	28	29	30	31	32	33	34	35	36	37	2 10
40	48 3	48 59	49 56	50 52	51 49	52 45	53 42	54 38	40	38	39	40	41	42	43	44	45	46	46	3 9
50	48 1	48 57	49 54	50 50	51 47	52 43	53 39	54 36	50	47	48	49	50	51	52	53	54	55	56	4 9
20° 0′	47 59	48 55	49 52	50 48	51 45	52 41	53 37	54 34	0	0	1	2	3	4	5	6	7	8	8	5 9
10	47 57	48 53	49 50	50 46	51 42	52 39	53 35	54 31	10	9	10	11	12	13	14	15	16	17	18	6 9
20	47 55	48 51	49 48	50 44	51 40	52 36	53 33	54 29	20	19	20	21	22	22	23	24	25	26	27	7 9
30	47 53	48 49	49 46	50 42	51 38	52 34	53 30	54 27	30	28	29	30	31	32	33	34	35	36	37	8 8
40	47 51	48 47	49 43	50 40	51 36	52 32	53 28	54 24	40	37	38	39	40	41	42	43	44	45	46	9 8
50	47 49	48 45	49 41	50 37	51 34	52 30	53 26	54 22	50	47	48	49	50	51	51	52	53	54	55	
21° 0′	47 47	48 43	49 39	50 35	51 31	52 27	53 23	54 19	0	0	1	2	3	4	5	6	7	7	8	
10	47 45	48 41	49 37	50 33	51 29	52 25	53 21	54 17	10	9	10	11	12	13	14	15	16	17	18	0′ 10″
20	47 43	48 39	49 35	50 30	51 26	52 22	53 18	54 14	20	19	20	21	21	22	23	24	25	26	27	1 10
30	47 41	48 36	49 32	50 28	51 24	52 20	53 16	54 11	30	28	29	30	31	31	32	33	34	35	36	2 10
40	47 38	48 34	49 30	50 26	51 21	52 17	53 13	54 9	40	37	38	39	40	41	42	43	44	45	46	3 9
50	47 36	48 32	49 27	50 23	51 19	52 15	53 10	54 6	50	47	47	48	49	50	51	52	53	54	55	4 9
22° 0′	47 34	48 29	49 25	50 21	51 16	52 12	53 8	54 3	0	0	1	2	3	4	5	6	6	7	8	5 9
10	47 31	48 27	49 22	50 18	51 14	52 9	53 5	54 0	10	9	10	11	12	13	14	15	16	17	17	6 8
20	47 29	48 24	49 20	50 15	51 11	52 6	53 2	53 57	20	18	19	20	21	22	23	24	25	26	27	7 8
30	47 26	48 22	49 17	50 13	51 8	52 4	52 59	53 54	30	28	29	30	30	31	32	33	34	35	36	8 8
40	47 24	48 19	49 15	50 10	51 5	52 1	52 56	53 51	40	37	38	39	40	41	42	43	43	44	45	9 8
50	47 21	48 17	49 12	50 7	51 3	51 58	52 53	53 48	50	46	47	48	49	50	51	52	53	54	55	

TABLE XXII.

Logarithms of the Moon's Apparent Altitude.

☽'s App. Alt.	MOON'S HORIZONTAL PARALLAX.								Add for Seconds of Parallax.										Add for Minutes of Alt.
	54′	55′	56′	57′	58′	59′	60′	61′	″	0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	
13° 0′	4.299588	9558	9527	9497	9466	9436	9406	9375	0	50	49	49	48	48	47	47	46	46	45	
10	9569	9538	9507	9477	9446	9415	9384	9354	10	45	44	44	43	43	42	42	41	41	40	0′ 20
20	9549	9519	9487	9456	9425	9394	9363	9332	20	40	39	38	38	37	37	36	36	35	35	1 18
30	9530	9499	9467	9436	9404	9373	9342	9310	30	34	34	33	33	32	32	31	31	30	30	2 16
40	9511	9479	9447	9415	9383	9352	9320	9288	40	29	29	28	28	27	26	26	25	25	24	3 14
50	9491	9459	9427	9395	9363	9331	9298	9266	50	24	23	23	22	22	21	21	20	20	19	4 12
14° 0′	4.299472	9440	9407	9374	9342	9310	9277	9244	0	50	49	49	48	48	47	47	46	46	45	5 10
10	9452	9420	9387	9354	9321	9288	9255	9222	10	44	44	43	43	42	42	41	40	40	39	6 8
20	9433	9400	9367	9334	9301	9267	9234	9200	20	39	38	38	37	37	36	35	35	34	34	7 6
30	9414	9380	9347	9313	9280	9246	9212	9179	30	33	33	32	32	31	30	30	29	29	28	8 4
40	9395	9360	9327	9292	9259	9225	9191	9157	40	28	27	26	26	25	25	24	24	23	23	9 2
50	9375	9341	9307	9272	9238	9204	9169	9135	50	22	21	21	20	20	19	19	18	18	17	
15° 0′	4.299356	9321	9287	9252	9218	9183	9148	9113	0	50	49	49	48	48	47	46	46	45	45	
10	9337	9302	9267	9232	9197	9162	9127	9092	10	44	43	43	42	42	41	40	40	39	39	0′ 20
20	9318	9283	9247	9212	9176	9141	9106	9070	20	38	37	37	36	36	35	35	34	33	33	1 18
30	9299	9263	9227	9192	9156	9120	9084	9049	30	32	32	31	30	30	29	29	28	27	27	2 16
40	9279	9243	9207	9171	9135	9099	9063	9027	40	26	26	25	24	24	23	23	22	21	21	3 14
50	9260	9224	9187	9151	9115	9078	9042	9005	50	20	20	19	18	18	17	17	16	15	15	4 12
16° 0′	4.299241	9205	9168	9131	9094	9057	9021	8984	0	50	49	49	48	47	47	46	46	45	44	5 10
10	9222	9185	9148	9111	9074	9036	8999	8962	10	44	43	42	42	41	41	40	39	39	38	6 8
20	9203	9165	9128	9090	9053	9015	8978	8940	20	37	37	36	35	35	34	34	33	32	32	7 6
30	9184	9146	9108	9070	9032	8994	8956	8919	30	31	30	30	29	29	28	27	27	26	25	8 4
40	9165	9126	9088	9050	9012	8973	8935	8897	40	25	24	23	23	22	22	21	20	20	19	9 2
50	9146	9107	9068	9030	8991	8953	8914	8876	50	18	18	17	17	16	15	15	14	13	13	
17° 0′	4.299127	9088	9049	9010	8971	8932	8893	8854	0	50	49	49	48	47	47	46	46	45	44	
10	9107	9068	9029	8990	8950	8911	8872	8832	10	43	43	42	41	41	40	39	39	38	37	0′ 20
20	9088	9049	9009	8970	8930	8890	8851	8811	20	37	36	35	35	34	33	33	32	31	31	1 18
30	9070	9030	8990	8950	8910	8870	8830	8790	30	30	29	29	28	27	27	26	25	25	24	2 16
40	9051	9010	8970	8930	8889	8849	8808	8768	40	23	23	22	21	21	20	19	19	18	17	3 14
50	9032	8991	8950	8910	8869	8828	8787	8747	50	17	16	15	15	14	13	13	12	11	11	4 12
18° 0′	4.299013	8972	8931	8890	8849	8808	8766	8726	0	50	49	49	48	47	46	46	45	44	44	5 10
10	8994	8952	8911	8870	8828	8787	8745	8704	10	43	42	42	41	40	39	39	38	37	37	6 8
20	8975	8933	8892	8850	8808	8766	8724	8683	20	36	35	35	34	33	32	32	31	30	30	7 6
30	8956	8914	8872	8830	8788	8745	8703	8661	30	29	28	28	27	26	25	25	24	23	23	8 4
40	8937	8895	8852	8810	8767	8725	8682	8640	40	22	21	21	20	19	18	18	17	16	16	9 2
50	8918	8876	8833	8790	8747	8704	8662	8619	50	15	14	14	13	12	11	11	10	9	9	
19° 0′	4.298900	8857	8814	8771	8728	8684	8641	8597	0	50	49	49	48	47	46	46	45	44	43	
10	8881	8837	8794	8751	8707	8663	8620	8576	10	43	42	41	40	40	39	38	37	37	36	0′ 20
20	8862	8818	8774	8731	8687	8643	8599	8555	20	35	35	34	33	32	32	31	30	29	29	1 18
30	8843	8799	8755	8711	8666	8622	8578	8534	30	28	27	26	25	25	24	23	23	22	21	2 16
40	8824	8780	8735	8691	8646	8602	8557	8513	40	21	20	19	18	18	17	16	15	15	14	3 14
50	8806	8761	8716	8671	8626	8581	8536	8492	50	13	12	12	11	10	9	9	8	7	7	4 12
20° 0′	4.298787	8742	8697	8652	8606	8561	8516	8471	0	50	49	48	48	47	46	45	45	44	43	5 10
10	8768	8723	8677	8632	8586	8541	8495	8449	10	42	42	41	40	39	38	38	37	36	35	6 8
20	8750	8704	8658	8612	8566	8520	8474	8428	20	35	34	33	32	32	31	30	29	28	28	7 6
30	8731	8685	8639	8592	8546	8500	8454	8407	30	27	26	25	25	24	23	22	21	21	20	8 4
40	8713	8666	8619	8573	8526	8479	8433	8386	40	19	18	18	17	16	15	15	14	13	12	9 2
50	8694	8647	8600	8553	8506	8459	8412	8365	50	11	11	10	9	8	8	7	6	5	5	
21° 0′	4.298675	8628	8581	8534	8486	8439	8392	8344	0	50	49	48	48	47	46	45	44	44	43	
10	8657	8609	8562	8514	8466	8419	8371	8323	10	42	41	40	40	39	38	37	36	36	35	0′ 20
20	8638	8590	8542	8494	8446	8398	8350	8302	20	34	33	32	32	31	30	29	28	27	27	1 18
30	8620	8571	8523	8475	8426	8378	8330	8282	30	26	25	24	23	23	22	21	20	19	19	2 16
40	8601	8553	8504	8455	8407	8358	8309	8261	40	18	17	16	15	15	14	13	12	11	11	3 14
50	8583	8534	8485	8436	8387	8338	8289	8240	50	10	9	8	7	7	6	5	4	3	3	4 12
22° 0′	4.298565	8516	8466	8417	8367	8318	8269	8220	0	50	49	48	47	47	46	45	44	43	42	5 10
10	8546	8497	8447	8397	8348	8298	8248	8199	10	42	41	40	39	38	37	37	36	35	34	6 8
20	8528	8478	8428	8378	8328	8278	8228	8178	20	33	32	32	31	30	29	28	27	27	26	7 6
30	8509	8459	8409	8358	8308	8257	8207	8157	30	25	24	23	22	22	21	20	19	18	17	8 4
40	8491	8440	8389	8339	8288	8237	8187	8136	40	17	16	15	14	13	12	11	11	10	9	9 2
50	8473	8422	8370	8319	8268	8217	8166	8115	50	8	7	6	6	5	4	3	2	1	1	

App. Alt. of ☉ or ✱	° 3	° 4	° 5	° 6	° 7	° 8	° 9	° 10	° 12	° 14	° 16	° 18	° 20	° 22	° 24	° 26	° 28	° 30	° 32	° 34	° 36	° 38	° 40	° 45	° 50	° 55	° 60	° 65	° 70	° 75	° 80	° 85	° 90
Add for ☉'s Alt.	2	11	16	19	21	22	23	23	24	24	24	23	22	22	21	21	21	20	20	19	19	19	18	17	16	15	14	13	13	12	12	11	11
Add for ✱'s Alt.	3	12	18	21	23	24	25	26	27	28	29	29	29	29	29	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

TABLE XXI.

Correction of the Moon's Apparent Altitude.

☽'s App. Alt.	Moon's Horizontal Parallax.																Add for Seconds of Parallax.										Add for Minutes of Alt.
	54′		55′		56′		57′		58′		59′		60′		61′			0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	
	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″	″	″	″	″	″	″	″	″	″	″	″	
23° 0′	47	19	48	14	49	9	50	4	51	0	51	55	52	50	53	45	0	0	1	2	3	4	5	6	6	7	8	
10	47	16	48	11	49	6	50	2	50	57	51	52	52	47	53	42	10	9	10	11	12	13	14	15	16	17	17	0′ 10″
20	47	13	48	9	49	4	49	59	50	54	51	49	52	44	53	39	20	18	19	20	21	22	23	24	25	26	27	1 10
30	47	11	48	6	49	1	49	56	50	51	51	46	52	41	53	36	30	28	28	29	30	31	32	33	34	35	36	2 9
40	47	8	48	3	48	58	49	53	50	48	51	43	52	38	53	33	40	37	38	39	39	40	41	42	43	44	45	3 9
50	47	5	48	0	48	55	49	50	50	45	51	40	52	34	53	29	50	46	47	48	49	50	50	51	52	53	54	4 9
24° 0′	47	2	47	57	48	52	49	47	50	42	51	37	52	31	53	26	0	0	1	2	3	4	5	5	6	7	8	5 8
10	47	0	47	54	48	49	49	44	50	38	51	33	52	28	53	23	10	9	10	11	12	13	14	15	16	16	17	6 8
20	46	57	47	51	48	46	49	41	50	35	51	30	52	25	53	19	20	18	19	20	21	22	23	24	25	25	26	7 8
30	46	54	47	48	48	43	49	37	50	32	51	27	52	21	53	16	30	27	28	29	30	31	32	33	34	35	35	8 8
40	46	51	47	45	48	40	49	34	50	29	51	23	52	18	53	12	40	36	37	38	39	40	41	42	43	44	45	9 7
50	46	48	47	42	48	37	49	31	50	25	51	20	52	14	53	9	50	46	47	47	48	49	50	51	52	53	54	
25° 0′	46	45	47	39	48	33	49	28	50	22	51	17	52	11	53	5	0	0	1	2	3	4	5	5	6	7	8	
10	46	42	47	36	48	30	49	24	50	19	51	13	52	7	53	2	10	9	10	11	12	13	14	14	15	16	17	0′ 10″
20	46	38	47	33	48	27	49	21	50	15	51	10	52	4	52	58	20	18	19	20	21	22	23	23	24	25	26	1 10
30	46	35	47	29	48	24	49	18	50	12	51	6	52	0	52	54	30	27	28	29	30	31	32	32	33	34	35	2 9
40	46	32	47	26	48	20	49	14	50	8	51	3	51	57	52	51	40	36	37	38	39	40	41	41	42	43	44	3 9
50	46	29	47	23	48	17	49	11	50	5	50	59	51	53	52	47	50	45	46	47	48	49	50	51	51	52	53	4 9
26° 0′	46	26	47	20	48	13	49	7	50	1	50	55	51	49	52	43	0	0	1	2	3	4	4	5	6	7	8	5 8
10	46	22	47	16	48	10	49	4	49	58	50	52	51	45	52	39	10	9	10	11	12	13	13	14	15	16	17	6 8
20	46	19	47	13	48	7	49	0	49	54	50	48	51	42	52	35	20	18	19	20	21	21	22	23	24	25	26	7 7
30	46	16	47	9	48	3	48	57	49	50	50	44	51	38	52	31	30	27	28	29	30	30	31	32	33	34	35	8 7
40	46	12	47	6	47	59	48	53	49	47	50	40	51	34	52	28	40	36	37	38	39	40	40	41	42	43	44	9 7
50	46	9	47	2	47	56	48	49	49	43	50	36	51	30	52	24	50	45	46	47	47	48	49	50	51	52	53	
27° 0′	46	5	46	59	47	52	48	46	49	39	50	33	51	26	52	20	0	0	1	2	3	4	4	5	6	7	8	
10	46	2	46	55	47	49	48	42	49	35	50	29	51	22	52	16	10	9	10	11	12	12	13	14	15	16	17	0′ 10″
20	45	58	46	52	47	45	48	38	49	32	50	25	51	18	52	11	20	18	19	20	20	21	22	23	24	25	26	1 10
30	45	55	46	48	47	41	48	34	49	28	50	21	51	14	52	7	30	27	27	28	29	30	31	32	33	34	35	2 9
40	45	51	46	44	47	37	48	30	49	24	50	17	51	10	52	3	40	35	36	37	38	39	40	41	42	43	43	3 9
50	45	48	46	41	47	34	48	27	49	20	50	13	51	6	51	59	50	44	45	46	47	48	49	50	51	51	52	4 8
28° 0′	45	44	46	37	47	30	48	23	49	16	50	9	51	2	51	55	0	0	1	2	3	4	4	5	6	7	8	5 8
10	45	40	46	33	47	26	48	19	49	12	50	5	50	58	51	50	10	9	10	11	11	12	13	14	15	16	17	6 8
20	45	36	46	29	47	22	48	15	49	8	50	0	50	54	51	46	20	18	18	19	20	21	22	23	24	25	25	7 7
30	45	33	46	25	47	18	48	11	49	4	49	56	50	49	51	42	30	2	27	28	29	30	31	32	32	33	34	8 7
40	45	29	46	22	47	14	48	7	48	59	49	52	50	45	51	37	40	35	36	37	38	39	40	40	41	42	43	9 6
50	45	25	46	18	47	10	48	3	48	55	49	48	50	40	51	33	50	44	45	46	47	47	48	49	50	51	52	
29° 0′	45	21	46	14	47	6	47	59	48	51	49	44	50	36	51	29	0	0	1	2	3	3	4	5	6	7	8	
10	45	17	46	10	47	2	47	55	48	47	49	39	50	32	51	24	10	9	10	10	11	12	13	14	15	16	17	0′ 10″
20	45	13	46	6	46	58	47	50	48	43	49	35	50	27	51	20	20	17	18	19	20	21	22	23	23	24	25	1 10
30	45	9	46	2	46	54	47	46	48	38	49	31	50	23	51	15	30	26	27	28	29	30	30	31	32	33	34	2 9
40	45	5	45	58	46	50	47	42	48	34	49	26	50	18	51	10	40	35	36	37	37	38	39	40	41	42	43	3 9
50	45	1	45	54	46	46	47	38	48	30	49	22	50	14	51	6	50	44	44	45	46	47	48	49	50	50	51	4 8
30° 0′	44	57	45	49	46	41	47	33	48	25	49	17	50	9	51	1	0	0	1	2	3	3	4	5	6	7	8	5 8
10	44	53	45	45	46	37	47	29	48	21	49	13	50	5	50	57	10	9	9	10	11	12	13	14	15	16	16	6 7
20	44	49	45	41	46	33	47	25	48	16	49	8	50	0	50	52	20	17	18	19	20	21	22	22	23	24	25	7 7
30	44	45	45	37	46	29	47	20	48	12	49	4	49	55	50	47	30	26	27	28	28	29	30	31	32	33	34	8 6
40	44	41	45	33	46	24	47	16	48	7	48	59	49	51	50	42	40	34	35	36	37	38	39	40	41	41	42	9 6
50	44	37	45	28	46	20	47	11	48	3	48	54	49	46	50	37	50	43	44	45	46	47	47	48	49	50	51	
31° 0′	44	33	45	24	46	15	47	7	47	58	48	50	49	41	50	33	0	0	1	2	3	3	4	5	6	7	8	
10	44	28	45	20	46	11	47	2	47	54	48	45	49	36	50	28	10	9	9	10	11	12	13	14	15	15	16	0′ 10″
20	44	24	45	15	46	7	46	58	47	49	48	40	49	32	50	23	20	17	18	19	20	20	21	22	23	24	25	1 10
30	44	20	45	11	46	2	46	53	47	44	48	36	49	27	50	18	30	26	26	27	28	29	30	31	32	32	33	2 9
40	44	15	45	6	45	58	46	49	47	40	48	31	49	22	50	13	40	34	35	36	37	38	38	39	40	41	42	3 9
50	44	11	45	2	45	53	46	44	47	35	48	26	49	17	50	8	50	43	44	44	45	46	47	48	49	49	50	4 8
32° 0′	44	7	44	58	45	48	46	39	47	30	48	21	49	12	50	3	0	0	1	2	3	3	4	5	6	7	8	5 8
10	44	2	44	53	45	44	46	35	47	25	48	16	49	7	49	58	10	9	9	10	11	12	13	13	14	15	16	6 7
20	43	58	44	48	45	39	46	30	47	21	48	11	49	2	49	53	20	17	18	18	19	20	21	22	23	23	24	7 7
30	43	53	44	44	45	35	46	25	47	16	48	6	48	57	49	48	30	25	26	27	28	28	29	30	31	32	33	8 6
40	43	49	44	39	45	30	46	20	47	11	48	1	48	52	49	42	40	33	34	35	36	37	38	38	39	40	41	9 6
50	43	44	44	35	45	25	46	16	47	6	47	56	48	47	49	37	50	42	43	43	44	45	46	47	48	48	49	

TABLE XXII.

Logarithms of the Moon's Apparent Altitude.

☽'s App. Alt.	MOON'S HORIZONTAL PARALLAX.							
	54′	55′	56′	57′	58′	59′	60′	61′
23° 0′	4.298354	8303	8251	8200	8149	8097	8046	7994
10	8336	8284	8232	8181	8129	8077	8026	7974
20	8318	8266	8214	8161	8109	8057	8005	7953
30	8299	8247	8195	8142	8090	8037	7985	7933
40	8281	8229	8176	8123	8070	8018	7965	7912
50	8263	8210	8157	8104	8051	7998	7945	7892
24° 0′	4.298245	8192	8139	8085	8032	7978	7925	7872
10	8227	8173	8120	8066	8012	7958	7904	7851
20	8209	8155	8101	8046	7992	7938	7884	7830
30	8191	8136	8082	8027	7973	7918	7864	7810
40	8173	8118	8063	8008	7953	7899	7844	7789
50	8155	8099	8044	7989	7934	7879	7824	7769
25° 0′	4.298137	8081	8026	7970	7915	7859	7804	7748
10	8119	8063	8007	7951	7896	7840	7784	7728
20	8101	8045	7988	7932	7876	7820	7764	7708
30	8083	8026	7970	7913	7857	7801	7744	7688
40	8065	8008	7951	7894	7838	7781	7724	7667
50	8047	7990	7933	7875	7819	7761	7704	7647
26° 0′	4.298029	7972	7914	7857	7800	7742	7685	7627
10	8011	7953	7895	7838	7780	7722	7665	7607
20	7993	7935	7877	7819	7761	7703	7645	7587
30	7975	7917	7859	7800	7742	7683	7625	7567
40	7958	7899	7840	7781	7723	7664	7606	7546
50	7940	7881	7822	7763	7704	7645	7585	7526
27° 0′	4.297922	7863	7803	7744	7685	7625	7566	7506
10	7904	7845	7785	7725	7666	7606	7546	7486
20	7887	7827	7767	7707	7647	7587	7527	7467
30	7869	7809	7748	7688	7628	7567	7507	7447
40	7852	7791	7730	7669	7609	7548	7487	7427
50	7834	7773	7712	7651	7590	7529	7468	7407
28° 0′	4.297817	7756	7694	7633	7572	7510	7449	7387
10	7799	7738	7676	7614	7553	7491	7429	7367
20	7782	7720	7658	7596	7534	7472	7410	7348
30	7764	7702	7640	7577	7515	7453	7390	7328
40	7747	7684	7620	7559	7496	7434	7371	7308
50	7729	7666	7603	7540	7478	7415	7352	7289
29° 0′	4.297712	7649	7585	7522	7459	7396	7332	7269
10	7695	7631	7567	7504	7440	7377	7313	7249
20	7677	7613	7549	7486	7422	7358	7294	7230
30	7660	7596	7531	7467	7403	7339	7274	7210
40	7643	7578	7514	7449	7384	7320	7255	7191
50	7625	7561	7496	7431	7366	7301	7236	7171
30° 0′	4.297609	7543	7478	7413	7348	7283	7217	7152
10	7592	7526	7460	7394	7329	7264	7198	7132
20	7574	7508	7443	7376	7310	7245	7179	7113
30	7557	7491	7425	7358	7292	7226	7160	7094
40	7540	7473	7407	7340	7274	7207	7141	7074
50	7523	7456	7389	7322	7256	7189	7122	7055
31° 0′	4.297506	7439	7371	7304	7237	7170	7103	7036
10	7489	7421	7354	7286	7219	7152	7084	7017
20	7472	7404	7336	7269	7201	7133	7065	6997
30	7455	7387	7319	7251	7182	7114	7046	6978
40	7438	7369	7301	7233	7164	7096	7028	6959
50	7424	7352	7284	7215	7146	7078	7009	6940
32° 0′	4.297401	7335	7266	7197	7128	7059	6990	6921
10	7387	7318	7249	7179	7110	7041	6971	6902
20	7370	730[illegible]	7231	7162	7092	7022	6953	6883
30	7354	7284	7214	7144	7074	7004	6934	6864
40	7337	7267	7196	7126	7056	6986	6915	6845
50	7320	725[illegible]	7179	7109	7038	6968	6897	6826

Add for Seconds of Parallax.											Add for Minutes of Alt.
″	0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	
0	150	149	148	147	147	146	145	144	143	142	
10	141	140	140	139	138	137	136	135	134	133	0′ 20
20	133	132	131	130	129	128	127	126	126	125	1 18
30	124	123	122	121	120	120	119	118	117	116	2 16
40	115	114	113	113	112	111	110	109	108	107	3 14
50	106	106	105	104	103	102	101	100	99	99	4 12
0	150	149	148	147	146	145	145	144	143	142	5 10
10	141	140	139	138	137	136	136	135	134	133	6 8
20	132	131	130	129	128	127	126	126	125	124	7 6
30	123	122	121	120	119	118	117	116	116	115	8 4
40	114	113	112	111	110	109	108	107	106	106	9 2
50	105	104	103	102	101	100	99	98	97	97	
0	150	149	148	147	146	145	144	143	142	142	
10	141	140	139	138	137	136	135	134	133	132	0′ 20
20	131	130	129	128	127	127	126	125	124	123	1 18
30	122	121	120	119	118	117	116	115	114	113	2 16
40	112	111	111	110	109	108	107	106	105	104	3 14
50	103	102	101	100	99	98	97	96	95	95	4 12
0	150	149	148	147	146	145	144	143	142	141	5 10
10	140	139	138	137	136	135	134	133	133	132	6 9
20	131	130	129	128	127	126	125	124	123	122	7 7
30	121	120	119	118	117	116	115	114	113	112	8 5
40	111	110	109	108	107	106	105	104	103	102	9 3
50	101	100	99	99	98	97	96	95	94	93	
0	150	149	148	147	146	145	144	143	142	141	
10	140	139	138	137	136	135	134	133	132	131	0′ 20
20	130	129	128	127	126	125	124	123	122	121	1 18
30	120	119	118	117	116	116	114	113	112	111	2 16
40	110	109	108	107	106	105	104	103	102	101	3 14
50	100	99	98	97	96	95	94	93	92	91	4 13
0	150	149	148	147	146	145	144	143	142	141	5 11
10	140	139	138	137	136	135	134	133	132	131	6 9
20	129	128	127	126	125	124	123	122	121	120	7 7
30	119	118	117	116	115	114	113	112	111	109	8 5
40	108	107	106	105	104	103	102	101	100	99	9 3
50	98	97	96	95	94	93	92	91	90	89	
0	150	149	148	147	146	145	144	143	141	140	
10	139	138	137	136	135	134	133	132	131	130	0′ 20
20	129	127	126	125	124	123	122	121	120	119	1 18
30	118	117	116	115	114	113	111	110	109	108	2 16
40	107	106	105	104	103	102	101	100	99	98	3 15
50	96	95	94	93	92	91	90	89	88	87	4 13
0	150	149	148	147	146	144	143	142	141	140	5 11
10	139	138	137	136	135	133	132	131	130	129	6 9
20	128	127	126	125	124	122	121	120	119	118	7 7
30	117	116	115	114	113	111	110	109	108	107	8 5
40	106	105	104	103	101	100	99	98	97	96	9 4
50	95	94	93	92	90	89	88	87	86	85	
0	150	149	148	147	145	144	143	142	141	140	
10	139	138	136	135	134	133	132	131	130	128	0′ 20
20	127	126	125	124	123	122	120	119	118	117	1 18
30	116	115	114	113	111	110	109	108	107	106	2 16
40	105	103	102	101	100	99	98	97	96	94	3 15
50	93	92	91	90	89	88	86	85	84	83	4 13
0	150	149	148	147	145	144	143	142	141	140	5 11
10	138	137	136	135	134	133	131	130	129	128	6 9
20	127	126	124	123	122	121	120	119	117	116	7 7
30	115	114	113	112	110	109	108	107	106	105	8 6
40	103	102	101	100	99	98	96	95	94	93	9 4
50	92	91	89	88	87	86	85	84	82	81	

App. Alt. of ☉ or ✱	° 3	° 4	° 5	° 6	° 7	° 8	° 9	° 10	° 12	° 14	° 16	° 18	° 20	° 22	° 24	° 26	° 28	° 30	° 32	° 34	° 36	° 38	° 40	° 45	° 50	° 55	° 60	° 65	° 70	° 75	° 80	° 85	° 90
Add for ☉'s Alt.	9	11	16	19	21	22	23	23	24	24	24	23	22	22	21	21	20	20	19	19	19	18	17	16	15	14	13	13	12	12	11	11	
Add for ✱'s Alt.	1	18	21	23	24	25	26	27	28	29	29	29	29	29	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

TABLE XXI.

Correction of the Moon's Apparent Altitude.

☽'s App. Alt.	Moon's Horizontal Parallax.								Add for Seconds of Parallax.										Add for Minutes of Alt.
	54′	55′	56′	57′	58′	59′	60′	61′		0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″	″	″	″	″	″	″	″	″	″	″	
33° 0′	43 40	44 30	45 20	46 11	47 1	47 51	48 42	49 32	0	0	1	2	3	3	4	5	6	7	8	
10	43 35	44 25	45 16	46 6	46 56	47 46	48 36	49 27	10	8	9	10	11	12	13	13	14	15	16	0′ 10″
20	43 30	44 21	45 11	46 1	46 51	47 41	48 31	49 21	20	17	18	18	19	20	21	22	23	23	24	1 9
30	43 26	44 16	45 6	45 56	46 46	47 36	48 26	49 16	30	25	26	27	28	28	29	30	31	32	33	2 9
40	43 21	44 11	45 1	45 51	46 41	47 31	48 21	49 11	40	33	34	35	36	37	38	38	39	40	41	3 8
50	43 16	44 6	44 56	45 46	46 36	47 26	48 16	49 5	50	42	43	43	44	45	46	47	48	48	49	4 8
34° 0′	43 12	44 2	44 51	45 41	46 31	47 20	48 10	49 0	0	0	1	2	2	3	4	5	6	7	7	5 7
10	43 7	43 57	44 46	45 36	46 26	47 15	48 5	48 54	10	8	9	10	11	11	12	13	14	15	15	6 7
20	43 2	43 52	44 41	45 31	46 20	47 10	47 59	48 49	20	16	17	18	19	20	20	21	22	23	24	7 6
30	42 57	43 47	44 36	45 26	46 15	47 5	47 54	48 44	30	24	25	26	27	28	28	29	30	31	32	8 6
40	42 53	43 42	44 31	45 21	46 10	46 59	47 49	48 38	40	33	33	34	35	36	37	37	38	39	40	9 5
50	42 48	43 37	44 26	45 15	46 5	46 54	47 43	48 32	50	41	42	42	43	44	45	46	47	48	49	
35° 0′	42 43	43 32	44 21	45 10	45 59	46 49	47 38	48 27	0	0	1	2	2	3	4	5	6	7	7	
10	42 38	43 27	44 16	45 5	45 54	46 43	47 32	48 21	10	8	9	10	10	11	12	13	14	14	15	0′ 10″
20	42 33	43 22	44 11	45 0	45 49	46 38	47 27	48 16	20	16	17	18	18	19	20	21	22	23	23	1 9
30	42 28	43 17	44 6	44 55	45 43	46 32	47 21	48 10	30	24	25	26	27	27	28	29	30	31	31	2 9
40	42 23	43 12	44 0	44 49	45 38	46 27	47 15	48 4	40	32	33	34	35	35	36	37	38	39	39	3 8
50	42 18	43 7	43 55	44 44	45 33	46 21	47 10	47 58	50	40	41	42	43	43	44	45	46	47	48	4 8
36° 0′	42 13	43 1	43 50	44 39	45 27	46 16	47 4	47 53	0	0	1	2	2	3	4	5	6	6	7	5 7
10	42 8	42 56	43 45	44 33	45 22	46 10	46 58	47 47	10	8	9	10	10	11	12	13	13	14	15	6 7
20	42 3	42 51	43 39	44 28	45 16	46 4	46 53	47 41	20	16	17	18	19	19	20	21	22	23	23	7 6
30	41 58	42 46	43 34	44 22	45 11	45 59	46 47	47 35	30	24	25	26	27	27	28	29	30	31	31	8 6
40	41 52	42 41	43 29	44 17	45 5	45 53	46 41	47 29	40	32	33	34	35	35	36	37	38	39	39	9 5
50	41 47	42 36	43 23	44 11	44 59	45 47	46 35	47 23	50	40	41	42	43	43	44	45	46	47	47	
37° 0′	41 42	42 30	43 18	44 6	44 54	45 42	46 30	47 18	0	0	1	2	2	3	4	5	6	6	7	
10	41 37	42 25	43 12	44 0	44 48	45 36	46 21	47 12	10	8	9	10	10	11	12	13	13	14	15	0′ 10″
20	41 32	42 19	43 7	43 55	44 42	45 30	46 18	47 6	20	16	17	17	18	19	20	21	21	22	23	1 9
30	41 26	42 14	43 2	43 49	44 37	45 24	46 12	47 0	30	24	25	25	26	27	28	29	29	30	31	2 9
40	41 21	42 8	42 56	43 43	44 31	45 18	46 6	46 53	40	32	33	33	34	35	36	36	37	38	39	3 8
50	41 16	42 3	42 50	43 38	44 25	45 13	46 0	46 47	50	40	40	41	42	43	44	44	45	46	47	4 8
38° 0′	41 10	41 58	42 45	43 32	44 19	45 7	45 54	46 41	0	0	1	2	2	3	4	5	5	6	7	5 7
10	41 5	41 52	42 39	43 26	44 14	45 1	45 48	46 35	10	8	9	9	10	11	12	12	13	14	15	6 7
20	41 0	41 47	42 34	43 21	44 8	44 55	45 42	46 29	20	16	16	17	18	19	20	20	21	22	23	7 6
30	40 54	41 41	42 28	43 15	44 2	44 49	45 36	46 23	30	23	24	25	26	27	27	28	29	30	31	8 5
40	40 49	41 35	42 22	43 9	43 56	44 43	45 30	46 17	40	31	32	33	34	34	35	36	37	38	38	9 5
50	40 43	41 30	42 17	43 3	43 50	44 37	45 24	46 10	50	39	40	41	41	42	43	44	45	45	46	
39° 0′	40 38	41 24	42 11	42 58	43 44	44 31	45 17	46 4	0	0	1	2	2	3	4	5	5	6	7	
10	40 32	41 19	42 5	42 52	43 38	44 25	45 11	45 58	10	8	9	9	10	11	12	12	13	14	15	0′ 10″
20	40 27	41 13	41 59	42 46	43 32	44 19	45 5	45 51	20	15	16	17	18	19	19	20	21	22	23	1 9
30	40 21	41 7	41 54	42 40	43 26	44 12	44 59	45 45	30	23	24	25	25	26	27	28	29	29	30	2 9
40	40 15	41 2	41 48	42 34	43 20	44 6	44 53	45 39	40	31	32	32	33	34	35	36	36	37	38	3 8
50	40 10	40 56	41 42	42 28	43 14	44 0	44 46	45 32	50	39	39	40	41	42	42	43	44	45	46	4 8
40° 0′	40 4	40 50	41 36	42 22	43 8	43 54	44 40	45 26	0	0	1	2	2	3	4	5	5	6	7	5 7
10	39 58	40 44	41 30	42 16	43 2	43 48	44 34	45 19	10	8	8	9	10	11	11	12	13	14	14	6 6
20	39 53	40 38	41 24	42 10	42 56	43 41	44 27	45 13	20	15	16	17	17	18	19	20	21	21	22	7 6
30	39 47	40 33	41 18	42 4	42 50	43 35	44 21	45 7	30	23	24	24	25	26	27	27	28	29	30	8 5
40	39 41	40 27	41 12	41 58	42 43	43 29	44 14	45 0	40	30	31	32	33	33	34	35	36	36	37	9 5
50	39 36	40 21	41 6	41 52	42 37	43 23	44 8	44 53	50	38	39	40	40	41	42	43	43	44	45	
41° 0′	39 30	40 15	41 0	41 46	42 31	43 16	44 1	44 47	0	0	1	1	2	3	4	4	5	6	7	
10	39 24	40 9	40 54	41 40	42 25	43 10	43 55	44 40	10	7	8	9	10	10	11	12	13	13	14	0′ 10″
20	39 18	40 3	40 48	41 33	42 18	43 3	43 48	44 33	20	15	16	16	17	18	19	19	20	21	22	1 9
30	39 12	39 57	40 42	41 27	42 12	42 57	43 42	44 27	30	22	23	24	25	25	26	27	28	28	29	2 9
40	39 6	39 51	40 36	41 21	42 6	42 50	43 35	44 20	40	30	31	31	32	33	34	34	35	36	37	3 8
50	39 1	39 45	40 30	41 15	41 59	42 44	43 29	44 13	50	37	38	39	40	40	41	42	43	43	44	4 7
42° 0′	38 55	39 39	40 24	41 8	41 53	42 38	43 22	44 7	0	0	1	1	2	3	4	4	5	6	7	5 7
10	38 49	39 33	40 18	41 2	41 46	42 31	43 15	44 0	10	7	8	9	10	10	11	12	13	13	14	6 6
20	38 43	39 27	40 11	40 56	41 40	42 24	43 9	43 53	20	15	15	16	17	18	18	19	20	21	21	7 6
30	38 37	39 21	40 5	40 49	41 34	42 18	43 2	43 46	30	22	23	24	24	25	26	27	27	28	29	8 5
40	38 31	39 15	39 59	40 43	41 27	42 11	42 55	43 39	40	29	30	31	32	32	33	34	35	35	36	9 4
50	38 25	39 9	39 53	40 37	41 21	42 5	42 49	43 33	50	37	38	38	39	40	41	41	42	43	43	

Logarithms of the Moon's Apparent Altitude.

☽'s App. Alt.	Moon's Horizontal Parallax.								Add for Seconds of Parallax.										Add for Minutes of Alt.
	54′	55′	56′	57′	58′	59′	60′	61′	″	0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	
33° 0′	4.297304	7233	7162	7091	7020	6949	6878	6808	0	150	149	148	146	145	144	143	142	140	139	
10	7287	7216	7145	7073	7002	6931	6860	6789	10	138	137	136	134	133	132	131	130	128	127	0′ 20
20	7270	7199	7127	7056	6984	6913	6841	6770	20	126	125	124	122	121	120	119	118	116	115	1 18
30	7254	7182	7110	7038	6967	6895	6823	6751	30	114	113	112	110	109	108	107	106	104	103	2 17
40	7237	7165	7093	7021	6949	6877	6805	6733	40	102	101	100	98	97	96	95	94	92	91	3 15
50	7221	7148	7076	7004	6931	6859	6786	6714	50	90	89	88	87	85	84	83	82	80	79	4 13
34° 0′	4.297204	7132	7059	6986	6914	6841	6768	6696	0	150	149	148	146	145	144	143	141	140	139	5 11
10	7188	7115	7042	6969	6896	6823	6750	6677	10	138	137	135	134	133	132	130	129	128	127	6 10
20	7172	7098	7025	6952	6878	6805	6732	6658	20	125	124	123	122	121	119	118	117	116	114	7 8
30	7155	7082	7008	6934	6861	6787	6714	6640	30	113	112	111	109	108	107	106	105	103	102	8 6
40	7139	7065	6991	6917	6843	6769	6695	6621	40	101	100	98	97	96	95	94	92	91	90	9 5
50	7123	7048	6974	6900	6826	6751	6677	6603	50	89	87	86	85	84	83	81	80	79	78	
35° 0	4.297106	7032	6957	6883	6808	6734	6659	6585	0	150	149	147	146	145	144	142	141	140	139	
10	7090	7015	6940	6866	6791	6716	6641	6566	10	137	136	135	134	132	131	130	129	127	126	0′ 20
20	7074	6999	6924	6848	6773	6698	6623	6548	20	125	121	122	121	120	119	117	116	115	114	1 18
30	7058	6982	6907	6831	6756	6680	6605	6530	30	112	111	110	109	107	106	105	104	102	101	2 17
40	7042	6966	6890	6814	6739	6663	6587	6511	40	100	98	97	96	95	93	92	91	90	88	3 15
50	7025	6949	6873	6797	6721	6645	6569	6493	50	87	86	85	83	82	81	80	78	77	76	4 13
36° 0′	4.297009	6933	6857	6780	6704	6628	6551	6475	0	150	149	147	146	145	144	142	141	140	138	5 11
10	6993	6917	6840	6763	6687	6610	6534	6457	10	137	136	135	133	132	131	129	128	127	126	6 10
20	6977	6900	6823	6747	6670	6593	6516	6439	20	124	123	122	120	119	118	117	115	114	113	7 8
30	6961	6884	6807	6730	6652	6575	6498	6421	30	111	110	109	108	106	105	104	102	101	100	8 6
40	6945	6868	6790	6713	6635	6558	6480	6403	40	99	97	96	95	93	92	91	90	88	87	9 5
50	6929	6852	6774	6696	6618	6540	6463	6385	50	86	84	83	82	81	79	78	77	75	74	
37° 0′	4.296914	6835	6757	6679	6601	6523	6445	6367	0	150	149	147	146	145	143	142	141	139	138	
10	6898	6819	6741	6663	6584	6506	6427	6349	10	137	136	134	133	132	130	129	128	126	125	0′ 20
20	6882	6803	6725	6646	6567	6489	6410	6331	20	124	122	121	120	118	117	116	114	113	112	1 18
30	6866	6787	6708	6629	6550	6471	6392	6313	30	110	109	108	107	105	104	103	101	100	99	2 17
40	6851	6771	6693	6613	6533	6454	6375	6296	40	97	96	95	93	92	91	90	88	87	86	3 15
50	6835	6755	6676	6596	6517	6437	6358	6278	50	84	83	82	80	79	78	76	75	74	72	4 13
38° 0′	4.296819	6739	6659	6580	6500	6420	6340	6260	0	150	149	147	146	145	143	142	141	139	138	5 12
10	6803	6723	6643	6563	6483	6403	6323	6243	10	137	135	134	133	131	130	128	127	126	124	6 10
20	6788	6707	6627	6547	6466	6386	6305	6225	20	123	122	120	119	118	116	115	114	112	111	7 8
30	6772	6692	6611	6530	6450	6369	6288	6207	30	110	108	107	106	104	103	102	100	99	98	8 7
40	6757	6676	6595	6514	6433	6352	6271	6189	40	96	95	94	92	91	90	88	87	86	84	9 5
50	6741	6660	6579	6497	6416	6335	6253	6172	50	83	81	80	79	77	76	75	73	72	71	
39° 0′	4.296726	6644	6563	6481	6399	6318	6236	6155	0	150	149	147	146	145	143	142	140	139	138	
10	6710	6628	6546	6465	6383	6301	6219	6137	10	136	135	134	132	131	129	128	127	125	124	0′ 20
20	6695	6613	6531	6448	6366	6284	6202	6120	20	123	121	120	118	117	116	114	113	112	110	1 18
30	6679	6597	6515	6432	6350	6267	6185	6103	30	109	108	106	105	103	102	101	99	98	97	2 17
40	6664	6581	6499	6416	6333	6251	6168	6085	40	95	94	92	91	90	88	87	86	84	83	3 15
50	6649	6566	6483	6400	6317	6234	6151	6068	50	81	80	79	77	76	75	73	72	70	69	4 13
40° 0′	4.296634	6550	6467	6384	6301	6217	6134	6051	0	150	149	147	146	144	143	142	140	139	137	5 12
10	6618	6535	6451	6368	6284	6201	6117	6034	10	136	135	133	132	130	129	128	126	125	123	6 10
20	6603	6520	6436	6352	6268	6184	6100	6016	20	122	121	119	118	116	115	114	112	111	109	7 9
30	6588	6504	6420	6336	6252	6168	6083	5999	30	108	107	105	104	102	101	100	98	97	95	8 7
40	6573	6489	6404	6320	6235	6151	6067	5982	40	94	93	91	90	88	87	86	84	83	82	9 5
50	6558	6473	6389	6304	6219	6135	6050	5965	50	80	79	77	76	74	73	72	70	69	68	
41° 0′	4.296543	6458	6373	6288	6203	6118	6033	5948	0	150	149	147	146	144	143	141	140	139	137	
10	6528	6443	6358	6272	6187	6102	6017	5931	10	136	134	133	131	130	129	127	126	124	123	0′ 20
20	6513	6428	6342	6257	6171	6086	6000	5915	20	121	120	119	117	116	114	113	111	110	109	1 18
30	6498	6412	6327	6241	6155	6069	5984	5898	30	107	106	104	103	102	100	99	97	96	94	2 17
40	6483	6397	6311	6225	6139	6053	5967	5881	40	93	92	90	89	87	86	84	83	82	80	3 15
50	6469	6382	6296	6210	6123	6037	5951	5864	50	79	77	76	74	73	71	70	69	67	66	4 14
42° 0′	4.296454	6367	6281	6194	6107	6021	5934	5848	0	150	149	147	146	144	143	141	140	138	137	5 12
10	6439	6352	6265	6178	6092	6005	5918	5831	10	135	134	133	131	130	128	127	125	124	122	6 11
20	6424	6337	6250	6163	6076	5989	5902	5814	20	121	119	118	117	115	114	112	111	109	108	7 9
30	6410	6322	6235	6148	6060	5973	5885	5798	30	106	105	103	102	100	99	98	96	95	93	8 7
40	6395	6307	6220	6132	6044	5957	5869	5781	40	92	90	89	87	86	85	83	82	80	79	9 6
50	6381	6293	6205	6117	6029	5941	5853	5765	50	77	76	74	73	71	70	68	67	66	64	

App. Alt. of ○ or ✱	° 3	° 4	° 5	° 6	° 7	° 8	° 9	° 10	° 12	° 14	° 16	° 18	° 20	° 22	° 24	° 26	° 28	° 30	° 32	° 34	° 36	° 38	° 40	° 45	° 50	° 55	° 60	° 65	° 70	° 75	° 80	° 85	° 90
Add for ○'s Alt.	2	11	16	19	21	22	23	23	24	24	24	23	22	22	21	21	21	20	20	19	19	19	18	17	16	15	14	13	13	12	12	11	11
Add for ✱'s Alt.	3	12	18	21	23	24	25	26	27	28	29	29	29	29	29	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

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Correction of the Moon's Apparent Altitude.

☽'s App. Alt.	Moon's Horizontal Parallax. 54′	55′	56′	57′	58′	59′	60′	61′	Add for Seconds of Parallax. 0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	Add for Minutes of Alt.
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″	″	″	″	″	″	″	″	″	″	
43° 0′	38 19	39 2	39 46	40 30	41 14	41 58	42 42	43 26	0	0	1	1	2	3	4	4	5	6	7	
10	38 12	38 56	39 40	40 24	41 7	41 51	42 35	43 19	10	7	8	9	9	10	11	12	12	13	14	0′ 10″
20	38 6	38 50	39 34	40 17	41 1	41 45	42 28	43 12	20	15	15	16	17	17	18	19	20	20	21	1 9
30	38 0	38 44	39 27	40 11	40 54	41 38	42 21	43 5	30	22	22	23	24	25	25	26	27	28	28	2 9
40	37 54	38 37	39 21	40 4	40 48	41 31	42 14	42 58	40	29	30	30	31	32	33	33	34	35	36	3 8
50	37 48	38 31	39 14	39 58	40 41	41 24	42 8	42 51	50	36	37	38	38	39	40	41	41	42	43	4 7
44° 0′	37 42	38 25	39 8	39 51	40 34	41 17	42 1	42 44	0	0	1	1	2	3	4	4	5	6	6	5 7
10	37 35	38 18	39 1	39 44	40 27	41 10	41 54	42 37	10	7	8	9	9	10	11	11	12	13	14	6 6
20	37 29	38 12	38 55	39 38	40 21	41 4	41 47	42 30	20	14	15	16	16	17	18	19	19	20	21	7 5
30	37 23	38 6	38 49	39 31	40 14	40 57	41 40	42 23	30	21	22	23	24	24	25	26	26	27	28	8 5
40	37 17	37 59	38 42	39 25	40 7	40 50	41 33	42 15	40	29	29	30	31	31	32	33	34	34	35	9 4
50	37 10	37 53	38 36	39 18	40 1	40 43	41 26	42 8	50	36	36	37	38	39	39	40	41	41	42	
45° 0′	37 4	37 46	38 29	39 11	39 54	40 36	41 19	42 1	0	0	1	1	2	3	4	4	5	6	6	
10	36 58	37 40	38 22	39 5	39 47	40 29	41 12	41 54	10	7	8	8	9	10	11	11	12	13	13	0′ 10″
20	36 51	37 34	38 16	38 58	39 40	40 22	41 4	41 47	20	14	15	15	16	17	18	18	19	20	20	1 9
30	36 45	37 27	38 9	38 51	39 33	40 15	40 57	41 39	30	21	22	22	23	24	25	25	26	27	27	2 9
40	36 39	37 21	38 2	38 44	39 26	40 8	40 50	41 32	40	28	29	29	30	31	32	32	33	34	34	3 8
50	36 32	37 14	37 56	38 38	39 19	40 1	40 43	41 25	50	35	36	36	37	38	39	39	40	41	41	4 7
46° 0′	36 26	37 7	37 49	38 31	39 12	39 54	40 36	41 17	0	0	1	1	2	3	4	4	5	6	6	5 7
10	36 19	37 1	37 42	38 24	39 5	39 47	40 29	41 10	10	7	8	8	9	10	10	11	12	12	13	6 6
20	36 13	36 54	37 36	38 17	38 58	39 40	40 21	41 3	20	14	14	15	16	17	17	18	19	19	20	7 5
30	36 6	36 48	37 29	38 10	38 51	39 33	40 14	40 55	30	21	21	22	23	23	24	25	25	26	27	8 4
40	35 59	36 41	37 22	38 3	38 44	39 26	40 7	40 48	40	28	28	29	30	30	31	32	32	33	34	9 4
50	35 53	36 34	37 16	37 56	38 37	39 18	39 59	40 40	50	34	35	36	36	37	38	39	39	40	41	
47° 0′	35 47	36 28	37 9	37 49	38 30	39 11	39 52	40 33	0	0	1	1	2	3	3	4	5	5	6	
10	35 40	36 21	37 2	37 42	38 23	39 4	39 45	40 26	10	7	7	8	9	9	10	11	11	12	13	0′ 10″
20	35 33	36 14	36 55	37 35	38 16	38 57	39 37	40 18	20	14	14	15	16	16	17	18	18	19	20	1 9
30	35 27	36 7	36 48	37 28	38 9	38 49	39 30	40 10	30	20	21	22	22	23	24	24	25	26	26	2 9
40	35 20	36 0	36 41	37 21	38 2	38 42	39 23	40 3	40	27	28	28	29	30	30	31	32	32	33	3 8
50	35 13	35 54	36 34	37 14	37 55	38 35	39 15	39 55	50	34	34	35	36	37	37	38	39	39	40	4 7
48° 0′	35 7	35 47	36 27	37 7	37 47	38 27	39 8	39 48	0	0	1	1	2	3	3	4	5	5	6	5 6
10	35 0	35 40	36 20	37 0	37 40	38 20	39 0	39 40	10	7	7	8	9	9	10	11	11	12	13	6 6
20	34 53	35 33	36 13	36 53	37 33	38 13	38 53	39 32	20	13	14	15	15	16	17	17	18	19	19	7 5
30	34 46	35 26	36 6	36 47	37 26	38 5	38 45	39 25	30	20	21	21	22	23	23	24	25	25	26	8 4
40	34 40	35 19	35 59	36 39	37 18	37 58	38 37	39 17	40	27	27	28	29	29	30	30	31	32	32	9 4
50	34 33	35 12	35 52	36 31	37 11	37 50	38 30	39 9	50	33	34	34	35	36	36	37	38	38	39	
49° 0′	34 26	35 6	35 45	36 24	37 4	37 43	38 22	39 2	0	0	1	1	2	3	3	4	5	5	6	
10	34 19	34 59	35 38	36 17	36 56	37 35	38 15	38 54	10	6	7	8	8	9	10	10	11	12	12	0′ 10″
20	34 12	34 52	35 31	36 10	36 49	37 28	38 7	38 46	20	13	14	14	15	16	16	17	18	18	19	1 9
30	34 6	34 45	35 24	36 2	36 41	37 20	37 59	38 38	30	19	20	21	21	22	23	23	24	25	25	2 9
40	33 59	34 38	35 16	35 55	36 34	37 13	37 52	38 31	40	26	27	27	28	29	29	30	31	31	32	3 8
50	33 52	34 30	35 9	35 48	36 27	37 5	37 44	38 23	50	32	33	34	34	35	36	36	37	38	38	4 7
50° 0′	33 45	34 23	35 2	35 41	36 19	36 58	37 36	38 15	0	0	1	1	2	3	3	4	4	5	6	5 6
10	33 38	34 16	34 55	35 33	36 12	36 50	37 28	38 7	10	6	7	8	8	9	10	10	11	11	12	6 6
20	33 31	34 9	34 48	35 26	36 4	36 42	37 21	37 59	20	13	13	14	15	15	16	17	17	18	18	7 5
30	33 24	34 2	34 40	35 18	35 57	36 35	37 13	37 51	30	19	20	20	21	22	22	23	24	24	25	8 4
40	33 17	33 55	34 33	35 11	35 49	36 27	37 5	37 43	40	25	26	27	27	28	29	29	30	31	31	9 3
50	33 10	33 48	34 26	35 4	35 41	36 19	36 57	37 35	50	32	32	33	34	34	35	36	36	37	38	
51° 0′	33 3	33 41	34 18	34 56	35 34	36 12	36 49	37 27	0	0	1	1	2	2	3	4	4	5	6	
10	32 56	33 33	34 11	34 49	35 26	36 4	36 42	37 19	10	6	7	7	8	9	9	10	11	11	12	0 10″
20	32 49	33 26	34 4	34 41	35 19	35 56	36 34	37 11	20	12	13	14	14	15	16	16	17	17	18	1 9
30	32 42	33 19	33 56	34 33	35 11	35 48	36 26	37 3	30	19	19	20	21	21	22	22	23	24	24	2 8
40	32 35	33 12	33 49	34 26	35 3	35 41	36 18	36 55	40	25	26	26	27	27	28	29	29	30	30	3 8
50	32 27	33 4	33 42	34 19	34 56	35 33	36 10	36 47	50	31	32	32	33	34	34	35	35	36	37	4 7
52° 0′	32 20	32 57	33 34	34 11	34 48	35 25	36 2	36 39	0	0	1	1	2	2	3	4	4	5	5	5 6
10	32 13	32 50	33 27	34 3	34 40	35 17	35 54	36 31	10	6	7	7	8	9	9	10	10	11	12	6 5
20	32 6	32 43	33 19	33 56	34 33	35 9	35 46	36 23	20	12	13	13	14	15	15	16	16	17	18	7 5
30	31 59	32 35	33 12	33 48	34 25	35 1	35 38	36 14	30	18	19	19	20	21	21	22	23	23	24	8 4
40	31 51	32 28	33 4	33 41	34 17	34 53	35 30	36 6	40	24	25	26	26	27	27	28	29	29	30	9 3
50	31 44	32 20	32 57	33 33	34 9	34 45	35 22	35 58	50	30	31	32	32	33	33	34	35	35	36	

TABLE XXII.

Logarithms of the Moon's Apparent Altitude.

☽'s App. Alt.	Moon's Horizontal Parallax. 54′	55′	56′	57′	58′	59′	60′	61′	Add for Seconds of Parallax. ″	0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	Add for Minutes of Alt.
43° 0′	4.296366	6278	6190	6102	6013	5925	5837	5748	0	150	149	147	146	144	143	141	140	138	137	
10	6352	6263	6175	6086	5998	5909	5821	5732	10	135	134	132	131	129	128	126	125	123	122	0′ 20
20	6337	6248	6160	6071	5982	5893	5805	5716	20	120	119	117	116	114	113	111	110	108	107	1 18
30	6323	6234	6145	6056	5967	5878	5789	5700	30	106	104	103	101	100	98	97	95	94	92	2 17
40	6308	6219	6130	6040	5951	5862	5773	5683	40	91	89	88	86	85	83	82	80	79	77	3 15
50	6294	6204	6115	6025	5936	5846	5757	5667	50	76	74	73	71	70	68	67	66	64	63	4 14
44° 0′	4.296280	6190	6100	6010	5920	5830	5741	5651	0	150	148	147	145	144	142	141	139	138	136	5 12
10	6265	6175	6085	5995	5905	5815	5725	5635	10	135	133	132	130	129	127	126	124	123	121	6 11
20	6251	6161	6070	5980	5890	5799	5709	5619	20	120	118	117	115	114	112	111	109	108	106	7 9
30	6237	6146	6056	5965	5875	5784	5693	5603	30	105	103	102	100	99	97	96	94	93	91	8 8
40	6223	6132	6041	5950	5859	5768	5678	5587	40	90	88	87	85	84	82	81	79	78	76	9 6
50	6209	6118	6027	5935	5844	5753	5662	5571	50	75	73	72	70	69	67	66	64	63	61	
45° 0	4.296195	6103	6012	5921	5829	5738	5646	5555	0	150	148	147	145	144	142	141	139	138	136	
10	6181	6089	5997	5906	5814	5722	5631	5539	10	135	133	132	130	128	127	125	124	122	121	0′ 20
20	6167	6075	5983	5891	5799	5707	5615	5523	20	119	118	116	115	113	112	110	109	107	105	1 19
30	6153	6061	5968	5876	5784	5692	5600	5507	30	104	102	101	99	98	96	95	93	92	90	2 17
40	6139	6046	5954	5861	5769	5677	5584	5492	40	89	87	86	84	82	81	79	78	76	75	3 16
50	6125	6032	5940	5847	5754	5661	5569	5476	50	73	72	70	69	67	66	64	62	61	59	4 14
46° 0′	4.296111	6018	5925	5832	5739	5646	5553	5460	0	150	148	147	145	144	142	141	139	138	136	5 13
10	6097	6004	5911	5818	5725	5631	5538	5445	10	134	133	131	130	128	127	125	123	121	120	6 11
20	6084	5990	5897	5803	5710	5616	5523	5429	20	119	117	116	114	113	111	109	108	106	105	7 10
30	6070	5976	5883	5789	5695	5601	5508	5414	30	103	102	100	98	97	95	94	92	91	89	8 8
40	6056	5962	5868	5774	5680	5586	5493	5399	40	88	86	84	83	81	80	78	77	75	73	9 7
50	6043	5949	5854	5760	5666	5572	5477	5383	50	72	70	69	67	66	64	62	61	59	58	
47° 0′	4.296029	5935	5840	5746	5651	5557	5462	5368	0	150	148	147	145	144	142	140	139	137	136	
10	6016	5921	5826	5731	5637	5542	5447	5353	10	134	133	131	129	128	126	125	123	121	120	0′ 20
20	6002	5907	5812	5717	5622	5527	5432	5337	20	118	117	115	114	112	110	109	107	106	104	1 19
30	5989	5894	5798	5703	5608	5513	5417	5322	30	102	101	99	98	96	94	93	91	90	88	2 17
40	5975	5880	5784	5689	5594	5498	5403	5307	40	87	85	83	82	80	79	77	75	74	72	3 16
50	5962	5866	5771	5675	5579	5483	5388	5292	50	71	69	67	66	64	63	61	59	58	56	4 14
48° 0′	4.295949	5853	5757	5661	5565	5469	5373	5277	0	150	148	147	145	144	142	140	139	137	136	5 13
10	5935	5839	5743	5647	5551	5454	5358	5262	10	134	132	131	129	127	126	124	123	121	119	6 11
20	5922	5826	5729	5633	5536	5440	5344	5247	20	118	116	115	113	111	110	108	107	105	103	7 10
30	5909	5812	5716	5619	5522	5425	5329	5232	30	102	100	99	97	95	94	92	90	89	87	8 9
40	5896	5799	5702	5605	5508	5411	5314	5217	40	86	84	82	81	79	78	76	74	73	71	9 7
50	5883	5786	5688	5591	5494	5397	5300	5202	50	70	68	66	65	63	62	60	58	57	55	
49° 0′	4.295870	5772	5675	5577	5480	5382	5285	5188	0	150	148	147	145	143	142	140	139	137	135	
10	5857	5759	5661	5564	5466	5368	5271	5173	10	134	132	130	129	127	125	124	122	121	119	0′ 20
20	5844	5746	5648	5550	5452	5354	5256	5158	20	117	116	114	112	111	109	108	106	104	103	1 19
30	5831	5733	5634	5536	5438	5340	5242	5144	30	101	99	98	96	94	93	91	90	88	86	2 17
40	5818	5719	5621	5523	5424	5326	5227	5129	40	85	83	81	80	78	76	75	73	72	70	3 16
50	5805	5706	5608	5509	5410	5312	5213	5114	50	68	67	65	63	62	60	58	57	55	54	4 15
50° 0′	4.295792	5693	5594	5495	5397	5298	5199	5100	0	150	148	147	145	143	142	140	138	137	135	5 13
10	5779	5680	5581	5482	5383	5284	5185	5086	10	133	132	130	128	127	125	123	122	120	118	6 12
20	5767	5667	5568	5469	5369	5270	5171	5071	20	117	115	113	112	110	108	107	105	104	102	7 10
30	5754	5654	5555	5455	5356	5256	5156	5057	30	100	99	97	95	94	92	90	89	87	85	8 9
40	5741	5642	5542	5442	5342	5242	5142	5043	40	84	82	80	79	77	75	74	72	70	69	9 8
50	5729	5629	5529	5429	5329	5229	5129	5028	50	67	65	64	62	60	59	57	55	54	52	
51° 0′	4.295716	5616	5516	5416	5315	5215	5115	5014	0	150	148	147	145	143	142	140	138	137	135	
10	5704	5603	5503	5402	5302	5201	5101	5000	10	133	131	130	128	126	125	123	121	120	118	0′ 20
20	5692	5591	5490	5389	5289	5188	5087	4986	20	116	115	113	111	110	108	106	105	103	101	1 19
30	5679	5578	5477	5376	5275	5174	5073	4972	30	99	98	96	94	93	91	89	88	86	84	2 17
40	5667	5566	5464	5363	5262	5161	5060	4959	40	83	81	79	78	76	74	73	71	69	68	3 16
50	5655	5553	5452	5350	5249	5148	5046	4945	50	66	64	62	61	59	57	56	54	52	51	4 15
52° 0′	4.295642	5541	5439	5337	5236	5134	5033	4931	0	150	148	147	145	143	141	140	138	136	134	5 13
10	5630	5528	5426	5325	5223	5121	5019	4917	10	133	131	130	128	126	124	123	121	119	118	6 12
20	5618	5516	5414	5312	5210	5108	5006	4904	20	116	114	113	111	109	107	106	104	102	101	7 11
30	5606	5503	5401	5299	5197	5094	4992	4890	30	99	97	96	94	92	90	89	87	85	84	8 10
40	5594	5491	5389	5286	5184	5081	4979	4876	40	82	80	78	77	75	73	72	70	68	67	9 8
50	5582	5479	5376	5273	5171	5068	4965	4863	50	65	63	61	60	58	56	55	53	51	50	

App. Alt. of ☉ or ✱	° 3	° 4	° 5	° 6	° 7	° 8	° 9	° 10	° 12	° 14	° 16	° 18	° 20	° 22	° 24	° 26	° 28	° 30	° 32	° 34	° 36	° 38	° 40	° 45	° 50	° 55	° 60	° 65	° 70	° 75	° 80	° 85	° 90
Add for ☉'s Alt.	2	11	16	19	21	22	23	23	24	24	24	25	22	22	21	21	21	20	20	19	19	19	18	17	16	15	14	13	13	12	12	11	11
Add for ✱'s Alt.	3	12	18	21	23	24	25	26	27	28	29	29	29	29	29	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

Correction of the Moon's Apparent Altitude.

☽'s App. Alt.	Moon's Horizontal Parallax.								Add for Seconds of Parallax.										Add for Minutes of Alt.
	54′	55′	56′	57′	58′	59′	60′	61′		0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″	″	″	″	″	″	″	″	″	″	″	
53° 0′	31 37	32 13	32 49	33 25	34 1	34 38	35 14	35 50	0	0	1	1	2	2	3	4	4	5	5	
10	31 30	32 6	32 42	33 18	33 54	34 30	35 5	35 41	10	6	6	7	8	8	9	10	10	11	11	0′ 10″
20	31 22	31 58	32 34	33 10	33 46	34 22	34 57	35 33	20	12	12	13	14	14	15	15	16	17	17	1 9
30	31 15	31 51	32 26	33 2	33 38	34 14	34 49	35 25	30	18	18	19	20	20	21	21	22	23	23	2 8
40	31 8	31 43	32 19	32 54	33 30	34 5	34 41	35 17	40	24	24	25	26	26	27	27	28	29	29	3 8
50	31 0	31 35	32 11	32 47	33 22	33 57	34 33	35 8	50	30	30	31	32	32	33	33	34	35	35	4 7
54° 0′	30 53	31 28	32 3	32 39	33 14	33 49	34 25	35 0	0	0	1	1	2	2	3	3	4	5	5	5 6
10	30 46	31 21	31 56	32 31	33 6	33 41	34 16	34 52	10	6	6	7	8	8	9	9	10	10	11	6 5
20	30 38	31 13	31 48	32 23	32 58	33 33	34 8	34 43	20	12	12	13	13	14	15	15	16	16	17	7 5
30	30 31	31 6	31 41	32 15	32 50	33 25	34 0	34 35	30	17	18	19	19	20	20	21	21	22	23	8 4
40	30 23	30 58	31 33	32 8	32 42	33 17	33 52	34 26	40	23	24	24	25	26	26	27	27	28	28	9 3
50	30 16	30 51	31 25	32 0	32 34	33 9	33 43	34 18	50	29	30	30	31	31	32	32	33	34	34	
55° 0′	30 9	30 43	31 17	31 52	32 26	33 1	33 35	34 9	0	0	1	1	2	2	3	3	4	5	5	
10	30 1	30 35	31 10	31 44	32 18	32 52	33 27	34 1	10	6	6	7	7	8	8	9	10	10	11	0′ 10″
20	29 54	30 28	31 2	31 36	32 10	32 44	33 18	33 52	20	11	12	12	13	14	14	15	15	16	16	1 9
30	29 46	30 20	30 54	31 28	32 2	32 36	33 10	33 44	30	17	18	18	19	19	20	20	21	22	22	2 8
40	29 38	30 12	30 46	31 20	31 54	32 27	33 1	33 35	40	23	23	24	24	25	25	26	27	27	28	3 8
50	29 30	30 4	30 38	31 12	31 46	32 19	32 53	33 26	50	28	29	29	30	31	31	32	32	33	33	4 7
56° 0′	29 23	29 57	30 30	31 4	31 38	32 11	32 44	33 18	0	0	1	1	2	2	3	3	4	4	5	5 6
10	29 16	29 49	30 23	30 56	31 29	32 3	32 36	33 10	10	6	6	7	7	8	8	9	9	10	10	6 5
20	29 8	29 41	30 15	30 48	31 21	31 54	32 28	33 1	20	11	12	12	13	13	14	14	15	15	16	7 4
30	29 1	29 34	30 7	30 40	31 13	31 46	32 19	32 52	30	17	17	18	18	19	19	20	20	21	22	8 4
40	28 53	29 26	29 59	30 32	31 5	31 38	32 11	32 44	40	22	23	23	24	24	25	25	26	26	27	9 3
50	28 45	29 18	29 51	30 24	30 57	31 29	32 2	32 35	50	28	28	29	29	30	30	31	31	32	33	
57° 0′	28 38	29 10	29 43	30 16	30 48	31 21	31 54	32 26	0	0	1	1	2	2	3	3	4	4	5	
10	28 30	29 2	29 35	30 8	30 40	31 12	31 45	32 18	10	5	6	6	7	8	8	9	9	10	10	0′ 10″
20	28 22	28 55	29 27	29 59	30 32	31 4	31 37	32 9	20	11	11	12	12	13	13	14	14	15	16	1 9
30	28 14	28 47	29 19	29 51	30 23	30 56	31 28	32 0	30	16	17	17	18	18	19	19	20	20	21	2 8
40	28 7	28 39	29 11	29 43	30 15	30 47	31 19	31 51	40	21	22	23	23	24	24	25	25	26	26	3 8
50	27 59	28 31	29 3	29 35	30 7	30 39	31 11	31 43	50	27	27	28	28	29	30	30	31	31	32	4 7
58° 0′	27 51	28 23	28 55	29 27	29 59	30 30	31 2	31 34	0	0	1	1	2	2	3	3	4	4	5	5 6
10	27 43	28 15	28 47	29 19	29 50	30 22	30 53	31 25	10	5	6	6	7	7	8	8	9	9	10	6 5
20	27 36	28 7	28 39	29 10	29 42	30 13	30 45	31 16	20	10	11	11	12	13	13	14	14	15	15	7 4
30	27 28	27 59	28 31	29 2	29 33	30 5	30 36	31 7	30	16	16	17	17	18	18	19	19	20	20	8 3
40	27 20	27 51	28 23	28 54	29 25	29 56	30 27	30 59	40	21	21	22	22	23	23	24	25	25	26	9 3
50	27 12	27 43	28 14	28 46	29 17	29 48	30 19	30 50	50	26	27	27	28	28	29	29	30	30	31	
59° 0′	27 5	27 35	28 6	28 37	29 8	29 39	30 10	30 41	0	0	1	1	2	2	3	3	4	4	5	
10	26 57	27 27	27 58	28 29	29 0	29 30	30 1	30 32	10	5	6	6	7	7	8	8	9	9	10	0′ 10″
20	26 49	27 19	27 50	28 21	28 51	29 22	29 52	30 23	20	10	11	11	12	12	13	13	14	14	15	1 9
30	26 41	27 11	27 42	28 12	28 43	29 13	29 44	30 14	30	15	16	16	17	17	18	18	19	19	20	2 8
40	26 33	27 3	27 34	28 4	28 34	29 4	29 35	30 5	40	20	21	21	22	22	23	23	24	24	25	3 7
50	26 25	26 55	27 25	27 56	28 26	28 56	29 26	29 56	50	25	26	26	27	27	28	28	29	29	30	4 7
60° 0′	26 17	26 47	27 17	27 47	28 17	28 47	29 17	29 47	0	0	0	1	1	2	2	3	3	4	4	5 6
10	26 9	26 39	27 9	27 39	28 9	28 38	29 8	29 38	10	5	5	6	6	7	7	8	8	9	9	6 5
20	26 1	26 31	27 1	27 30	28 0	28 30	28 59	29 29	20	10	10	11	11	12	12	13	13	14	14	7 4
30	25 53	26 23	26 52	27 22	27 51	28 21	28 51	29 20	30	15	15	16	16	17	17	18	18	19	19	8 3
40	25 45	26 15	26 44	27 13	27 43	28 12	28 42	29 11	40	20	20	21	21	22	22	23	23	24	24	9 2
50	25 37	26 6	26 36	27 5	27 34	28 3	28 33	29 2	50	25	25	26	26	27	27	28	28	29	29	
61° 0′	25 29	25 58	26 27	26 56	27 26	27 55	28 24	28 53	0	0	0	1	1	2	2	3	3	4	4	
10	25 21	25 50	26 19	26 48	27 17	27 46	28 15	28 44	10	5	5	6	6	7	7	8	8	9	9	0′ 10″
20	25 13	25 42	26 11	26 39	27 8	27 37	28 6	28 35	20	10	10	10	11	11	12	12	13	13	14	1 9
30	25 5	25 34	26 2	26 31	27 0	27 28	27 57	28 25	30	14	15	15	16	16	17	17	18	18	19	2 8
40	24 57	25 25	25 54	26 22	26 51	27 19	27 48	28 16	40	19	20	20	21	21	21	22	22	23	23	3 7
50	24 49	25 17	25 46	26 14	26 42	27 11	27 39	28 7	50	24	24	25	25	26	26	27	27	28	28	4 7
62° 0′	24 41	25 9	25 37	26 5	26 33	27 2	27 30	27 58	0	0	0	1	1	2	2	3	3	4	4	5 6
10	24 33	25 1	25 29	25 57	26 25	26 53	27 21	27 49	10	5	5	6	6	6	7	7	8	8	9	6 5
20	24 25	24 52	25 20	25 48	26 16	26 44	27 12	27 40	20	9	10	10	11	11	12	12	12	13	13	7 4
30	24 16	24 44	25 12	25 40	26 7	26 35	27 3	27 30	30	14	14	15	15	16	16	17	17	18	18	8 3
40	24 8	24 36	25 3	25 31	25 58	26 26	26 54	27 21	40	18	19	19	20	20	21	21	22	22	23	9 2
50	24 0	24 28	24 55	25 22	25 50	26 17	26 44	27 12	50	23	24	24	24	25	25	26	26	27	27	

TABLE XXII.

Logarithms of the Moon's Apparent Altitude.

☽'s App. Alt.	MOON'S HORIZONTAL PARALLAX. 54′	55′	56′	57′	58′	59′	60′	61′	Add for Seconds of Parallax. ″	0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	Add for Minutes of Alt.
53° 0′	4.295570	5467	5364	5261	5158	5055	4952	4849	0	150	148	147	145	143	141	140	138	136	134	
10	5558	5455	5351	5248	5145	5042	4939	4836	10	133	131	129	128	126	124	122	121	119	117	0′ 20
20	5546	5442	5339	5236	5132	5029	4926	4822	20	116	114	112	110	109	107	105	103	102	100	1 19
30	5534	5430	5327	5223	5120	5016	4913	4809	30	98	97	95	93	91	90	88	86	85	83	2 17
40	5522	5418	5315	5211	5107	5003	4899	4796	40	81	79	78	76	74	72	71	69	67	66	3 16
50	5510	5406	5302	5198	5094	4990	4886	4782	50	64	62	60	59	57	55	53	52	50	48	4 15
54° 0′	4.295499	5394	5290	5186	5082	4978	4873	4769	0	150	148	147	145	143	141	140	138	136	134	5 14
10	5487	5382	5278	5174	5069	4965	4860	4756	10	133	131	129	127	126	124	122	120	119	117	6 12
20	5475	5371	5266	5162	5057	4952	4848	4743	20	115	113	112	110	108	106	104	103	101	99	7 11
30	5464	5359	5254	5149	5044	4940	4835	4730	30	98	96	94	92	91	89	87	85	84	82	8 10
40	5452	5347	5242	5137	5032	4927	4822	4717	40	80	78	77	75	73	71	70	68	66	64	9 9
50	5441	5336	5230	5125	5020	4914	4809	4704	50	63	61	59	57	56	54	52	50	48	47	
55° 0′	4.295430	5324	5219	5113	5008	4902	4797	4691	0	150	148	146	145	143	141	139	138	136	134	
10	5418	5313	5207	5101	4995	4890	4784	4678	10	132	131	129	127	125	123	122	120	118	116	0′ 20
20	5407	5301	5195	5089	4983	4877	4771	4665	20	115	113	111	109	108	106	104	102	100	99	1 19
30	5396	5290	5183	5077	4971	4865	4759	4653	30	97	95	93	92	90	88	86	84	83	81	2 18
40	5385	5278	5172	5065	4959	4853	4746	4640	40	79	77	76	74	72	70	69	67	65	63	3 16
50	5373	5267	5160	5054	4947	4841	4734	4627	50	62	60	58	56	54	53	51	49	47	46	4 15
56° 0′	4.295362	5256	5149	5042	4935	4828	4722	4615	0	150	148	146	145	143	141	139	137	136	134	5 14
10	5351	5244	5137	5030	4923	4816	4709	4602	10	132	130	129	127	125	123	121	120	118	116	6 13
20	5340	5233	5126	5019	4911	4804	4697	4590	20	114	112	111	109	107	105	103	102	100	98	7 12
30	5329	5222	5114	5007	4900	4792	4685	4577	30	96	95	93	91	89	87	86	84	82	80	8 10
40	5318	5211	5103	4996	4888	47-0	4673	4565	40	78	77	75	73	71	69	68	66	64	62	9 9
50	5307	5200	5092	4984	4876	4768	4661	4553	50	61	59	57	55	53	52	50	48	46	44	
57° 0′	4.295297	5189	5081	4973	4865	4756	4648	4540	0	150	148	146	145	143	141	139	137	136	134	
10	5286	5178	5069	4961	4853	4745	4636	4528	10	132	130	128	126	125	123	121	119	117	116	0′ 20
20	5275	5167	5058	4950	4841	4733	4624	4516	20	114	112	110	108	107	105	103	101	99	98	1 19
30	5264	5156	5047	4938	4830	4721	4613	4504	30	96	94	92	90	89	87	85	83	81	79	2 18
40	5254	5145	5036	4927	4818	4709	4601	4492	40	78	76	74	72	70	69	67	65	63	61	3 17
50	5243	5134	5025	4916	4807	4698	4589	4480	50	60	58	56	54	52	50	49	47	45	43	4 16
58° 0′	4.295233	5123	5014	4905	4796	4686	4577	4468	0	150	148	146	145	143	141	139	137	135	134	5 14
10	5222	5113	5003	4894	4784	4673	4566	4456	10	132	130	128	126	124	123	121	119	117	115	6 13
20	5212	5102	4992	4883	4773	4664	4554	4444	20	113	112	110	108	106	104	102	101	99	97	7 12
30	5201	5091	4982	4872	4762	4652	4542	4433	30	95	93	91	90	88	86	84	82	80	79	8 11
40	5191	5081	4971	4861	4751	4641	4531	4421	40	77	75	73	71	70	68	66	64	62	60	9 10
50	5181	5070	4960	4850	4740	4630	4519	4409	50	58	57	55	53	51	49	47	45	44	42	
59° 0′	4.295170	5060	4950	4839	4729	4618	4508	4398	0	150	148	146	144	143	141	139	137	135	133	
10	5160	5050	4939	4828	4718	4607	4497	4386	10	132	130	128	126	124	122	120	119	117	115	0′ 20
20	5150	5040	4928	4818	4707	4596	4485	4375	20	113	111	109	108	106	104	102	100	98	96	1 19
30	5140	5029	4918	4807	4696	4585	4474	4363	30	94	93	91	89	87	85	83	82	80	78	2 18
40	5130	5019	4908	4796	4685	4574	4463	4352	40	76	74	72	70	69	67	65	63	61	59	3 17
50	5120	5009	4897	4786	4675	4563	4452	4341	50	58	56	54	52	50	48	46	45	43	41	4 16
60° 0′	4.295110	4998	4887	4775	4664	4552	4441	4330	0	150	148	146	144	143	141	139	137	135	133	5 15
10	5100	4988	4877	4765	4653	4541	4430	4318	10	131	129	128	126	124	122	120	118	116	115	6 14
20	5090	4978	4866	4754	4643	4531	4419	4307	20	113	111	109	107	105	103	101	100	98	96	7 13
30	5080	4968	4856	4744	4632	4520	4408	4296	30	94	92	90	88	87	85	83	81	79	77	8 12
40	5071	4958	4846	4734	4622	4509	4397	4285	40	75	73	77	70	68	66	64	62	60	58	9 11
50	5061	4948	4836	4724	4611	4499	4386	4274	50	57	55	53	51	49	47	45	43	42	40	
61° 0′	4.295051	4939	4826	4713	4601	4488	4376	4263	0	150	148	146	144	142	141	139	137	135	133	
10	5042	4929	4816	4703	4591	4478	4365	4252	10	131	129	127	126	124	122	120	118	116	114	0′ 20
20	5032	4919	4806	4693	4581	4467	4354	4241	20	112	110	109	107	105	103	101	99	97	95	1 19
30	5023	4909	4796	4683	4570	4457	4344	4231	30	93	92	90	88	86	84	82	80	78	77	2 18
40	5013	4900	4787	4673	4560	4447	4333	4220	40	75	73	71	69	67	65	63	61	60	58	3 17
50	5004	4890	4777	4663	4550	4436	4323	4209	50	56	54	52	50	48	46	45	43	41	39	4 16
62° 0′	4.294994	4881	4767	4654	4540	4426	4313	4199	0	150	148	146	144	142	140	139	137	135	133	5 15
10	4985	4871	4758	4644	4530	4416	4302	4188	10	131	129	127	125	123	121	120	118	116	114	6 14
20	4976	4862	4748	4634	4520	4406	4292	4178	20	112	110	108	106	104	102	101	99	97	95	7 13
30	4967	4852	4738	4624	4510	4396	4282	4168	30	93	91	89	87	85	84	82	80	78	76	8 12
40	4957	4843	4729	4615	4500	4386	4272	4157	40	74	72	70	68	66	64	63	61	59	57	9 11
50	4948	4834	4719	4605	4490	4376	4261	4147	50	55	53	51	49	47	45	43	41	40	38	

App. Alt. of ☉ or ☽	° 3	° 4	° 5	° 6	° 7	° 8	° 9	° 10	° 12	° 14	° 16	° 18	° 20	° 22	° 24	° 26	° 28	° 30	° 32	° 34	° 36	° 38	° 40	° 45	° 50	° 55	° 60	° 65	° 70	° 75	° 80	° 85	° 90
Add for ☉'s Alt.	2	11	16	19	21	22	23	23	24	24	24	23	23	22	21	21	21	20	20	19	19	19	18	17	16	15	14	13	13	12	11	11	11
Add for ☽'s Alt.	3	14	18	21	23	24	25	26	27	28	29	29	29	29	29	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

Correction of the Moon's Apparent Altitude.

☽'s App. Alt.	MOON'S HORIZONTAL PARALLAX.								Add for Seconds of Parallax.										Add for Minutes of Alt.
	54′	55′	56′	57′	58′	59′	60′	61′		0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″	″	″	″	″	″	″	″	″	″	″	
63° 0′	23 52	24 19	24 46	25 14	25 41	26 8	26 35	27 3	0	0	0	1	1	2	2	3	3	4	4	
10	23 44	24 11	24 38	25 5	25 32	25 59	26 26	26 53	10	4	5	5	6	6	7	7	8	8	8	0′ 10″
20	23 35	24 2	24 29	24 56	25 23	25 50	26 17	26 44	20	9	9	10	10	11	11	12	12	12	13	1 9
30	23 27	23 54	24 21	24 48	25 14	25 41	26 8	26 35	30	13	14	14	15	15	16	16	17	17	17	2 8
40	23 19	23 46	24 12	24 39	25 5	25 32	25 59	26 25	40	18	18	19	19	20	20	21	21	21	22	3 7
50	23 11	23 37	24 4	24 30	24 57	25 23	25 50	26 16	50	22	23	23	24	24	25	25	25	26	26	4 6
64° 0′	23 3	23 29	23 55	24 21	24 48	25 14	25 40	26 7	0	0	0	1	1	2	2	3	3	3	4	5 6
10	22 54	23 20	23 47	24 13	24 39	25 5	25 31	25 57	10	4	5	5	6	6	6	7	7	8	8	6 5
20	22 46	23 12	23 38	24 4	24 30	24 56	25 22	25 48	20	9	9	9	10	10	11	11	12	12	12	7 4
30	22 38	23 4	23 29	23 55	24 21	24 47	25 13	25 38	30	13	13	14	14	15	15	15	16	16	17	8 3
40	22 29	22 55	23 21	23 46	24 12	24 38	25 3	25 29	40	17	18	18	18	19	19	20	20	21	21	9 2
50	22 21	22 47	23 12	23 38	24 3	24 29	24 54	25 20	50	22	22	22	23	23	24	24	25	25	25	
65° 0′	22 13	22 38	23 3	23 29	23 54	24 20	24 45	25 10	0	0	0	1	1	2	2	2	3	3	4	
10	22 4	22 30	22 55	23 20	23 45	24 10	24 36	25 1	10	4	5	5	5	6	6	7	7	7	8	0′ 10″
20	21 56	22 21	22 46	23 11	23 36	24 1	24 26	24 51	20	8	9	9	10	10	10	11	11	12	12	1 9
30	21 48	22 13	22 37	23 2	23 27	23 52	24 17	24 42	30	12	13	13	14	14	14	15	15	16	16	2 8
40	21 39	22 4	22 29	22 53	23 18	23 43	24 8	24 32	40	17	17	17	18	18	19	19	19	20	20	3 7
50	21 31	21 55	22 20	22 45	23 9	23 34	23 58	24 23	50	21	21	21	22	22	23	23	24	24	24	4 6
66° 0′	21 22	21 47	22 11	22 36	23 0	23 24	23 49	24 13	0	0	0	1	1	2	2	2	3	3	4	5 6
10	21 14	21 38	22 3	22 27	22 51	23 15	23 40	24 4	10	4	4	5	5	6	6	6	7	7	8	6 5
20	21 6	21 30	21 54	22 18	22 42	23 6	23 30	23 54	20	8	8	9	9	10	10	10	11	11	12	7 4
30	20 57	21 21	21 45	22 9	22 33	22 57	23 21	23 45	30	12	12	13	13	14	14	14	15	15	16	8 3
40	20 49	21 13	21 36	22 0	22 24	22 48	23 11	23 35	40	16	16	17	17	18	18	18	19	19	20	9 2
50	20 40	21 4	21 27	21 51	22 15	22 38	23 2	23 25	50	20	20	21	21	21	22	22	23	23	23	
67° 0′	20 32	20 55	21 19	21 42	22 6	22 29	22 52	23 16	0	0	0	1	1	2	2	2	3	3	3	
10	20 23	20 47	21 10	21 33	21 56	22 20	22 43	23 6	10	4	4	5	5	5	6	6	6	7	7	0′ 10″
20	20 15	20 38	21 1	21 24	21 47	22 10	22 34	22 57	20	8	8	8	9	9	10	10	10	11	11	1 9
30	20 6	20 29	20 52	21 15	21 38	22 1	22 24	22 47	30	11	12	12	13	13	13	14	14	14	15	2 8
40	19 58	20 21	20 43	21 6	21 29	21 52	22 15	22 37	40	15	16	16	16	17	17	18	18	18	19	3 7
50	19 49	20 12	20 35	20 57	21 20	21 42	22 5	22 28	50	19	19	20	20	21	21	21	22	22	22	4 6
68° 0′	19 41	20 3	20 26	20 48	21 11	21 33	21 56	22 18	0	0	0	1	1	2	2	2	3	3	3	5 5
10	19 32	19 54	20 17	20 39	21 1	21 24	21 46	22 8	10	4	4	4	5	5	5	6	6	7	7	6 5
20	19 24	19 46	20 8	20 30	20 52	21 14	21 36	21 59	20	7	8	8	8	9	9	10	10	10	11	7 4
30	19 15	19 37	19 59	20 21	20 43	21 5	21 27	21 49	30	11	11	12	12	12	13	13	14	14	14	8 3
40	19 6	19 28	19 50	20 12	20 34	20 56	21 17	21 39	40	15	15	15	16	16	16	17	17	18	18	9 2
50	18 58	19 19	19 41	20 3	20 24	20 46	21 8	21 30	50	18	19	19	19	20	20	20	21	21	22	
69° 0′	18 49	19 11	19 32	19 54	20 15	20 37	20 58	21 20	0	0	0	1	1	1	2	2	2	3	3	
10	18 41	19 2	19 23	19 45	20 6	20 27	20 49	21 10	10	4	4	4	5	5	5	6	6	6	7	0′ 10″
20	18 32	18 53	19 14	19 36	19 57	20 18	20 39	21 0	20	7	7	8	8	8	9	9	9	10	10	1 9
30	18 23	18 44	19 5	19 26	19 47	20 8	20 29	20 50	30	11	11	11	12	12	12	13	13	13	14	2 8
40	18 15	18 36	18 56	19 17	19 38	19 59	20 20	20 41	40	14	14	15	15	15	16	16	16	17	17	3 7
50	18 6	18 27	18 47	19 8	19 29	19 50	20 10	20 31	50	18	18	18	19	19	19	20	20	20	21	4 6
70° 0′	17 57	18 18	18 39	18 59	19 20	19 40	20 1	20 21	0	0	0	1	1	1	2	2	2	3	3	5 5
10	17 49	18 9	18 29	18 50	19 10	19 31	19 51	20 11	10	3	4	4	4	5	5	5	6	6	6	6 4
20	17 40	18 0	18 20	18 41	19 1	19 21	19 41	20 1	20	7	7	7	8	8	8	9	9	9	10	7 3
30	17 31	17 51	18 11	18 31	18 51	19 12	19 32	19 52	30	10	10	11	11	11	12	12	12	13	13	8 3
40	17 23	17 43	18 2	18 22	18 42	19 2	19 22	19 42	40	13	14	14	14	15	15	15	16	16	16	9 2
50	17 14	17 34	17 53	18 13	18 33	18 52	19 12	19 32	50	17	17	17	18	18	18	19	19	19	20	
71° 0′	17 5	17 25	17 44	18 4	18 23	18 43	19 2	19 22	0	0	0	1	1	1	2	2	2	3	3	
10	16 56	17 16	17 35	17 55	18 14	18 33	18 53	19 12	10	3	3	4	4	4	5	5	5	6	6	0′ 10″
20	16 48	17 7	17 26	17 45	18 5	18 24	18 43	19 2	20	6	7	7	7	8	8	8	9	9	9	1 9
30	16 39	16 58	17 17	17 36	17 55	18 14	18 33	18 52	30	10	10	10	10	11	11	11	12	12	12	2 8
40	16 30	16 49	17 8	17 27	17 46	18 5	18 23	18 42	40	13	13	13	14	14	14	15	15	15	16	3 7
50	16 22	16 40	16 59	17 18	17 36	17 55	18 14	18 32	50	16	16	16	17	17	17	18	18	18	19	4 6
72° 0′	16 13	16 31	16 50	17 8	17 27	17 45	18 4	18 22	0	0	0	1	1	1	2	2	2	2	3	5 5
10	16 4	16 22	16 41	16 59	17 17	17 36	17 54	18 13	10	3	3	4	4	4	5	5	5	5	6	6 4
20	15 55	16 13	16 32	16 50	17 8	17 26	17 44	18 3	20	6	6	7	7	7	8	8	8	8	9	7 3
30	15 46	16 4	16 22	16 40	16 59	17 17	17 35	17 53	30	9	9	10	10	10	11	11	11	11	12	8 2
40	15 37	15 55	16 13	16 31	16 49	17 7	17 25	17 43	40	12	12	13	13	13	14	14	14	14	15	9 2
50	15 29	15 46	16 4	16 22	16 40	16 57	17 15	17 33	50	15	15	16	16	16	17	17	17	17	18	

TABLE XXII.

Logarithms of the Moon's Apparent Altitude.

☽'s App. Alt.	Moon's Horizontal Parallax.								Add for Seconds of Parallax.											Add for Minutes of Alt.
	54′	55′	56′	57′	58′	59′	60′	61′	″	0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	
63° 0′	4.294939	4825	4710	4595	4481	4366	4251	4137	0	150	148	146	144	142	140	138	137	135	133	
10	4930	4816	4701	4586	4471	4356	4241	4127	10	131	129	127	125	123	121	119	117	115	114	0′ 20
20	4921	4807	4692	4576	4461	4346	4231	4117	20	112	110	108	106	104	102	100	98	96	94	1 19
30	4913	4798	4682	4567	4452	4337	4222	4107	30	92	91	89	87	85	83	81	79	77	75	2 18
40	4904	4789	4673	4558	4442	4327	4212	4097	40	73	71	69	67	66	64	62	60	58	56	3 17
50	4895	4780	4664	4549	4433	4318	4202	4087	50	54	52	50	48	46	44	43	41	39	37	4 16
64° 0′	4.294886	4771	4655	4539	4424	4308	4192	4077	0	150	148	146	144	142	140	138	136	135	133	5 15
10	4878	4762	4646	4530	4414	4298	4183	4067	10	131	129	127	125	123	121	119	117	115	113	6 14
20	4869	4753	4637	4521	4405	4289	4173	4057	20	110	109	107	106	104	102	100	98	96	94	7 14
30	4860	4744	4628	4512	4396	4280	4164	4047	30	92	90	88	86	84	82	80	79	77	75	8 13
40	4852	4736	4619	4503	4387	4270	4154	4038	40	73	71	69	67	65	63	61	59	57	55	9 12
50	4843	4727	4611	4494	4378	4261	4145	4028	50	53	51	49	48	46	44	42	40	38	36	
65° 0	4.294835	4718	4602	4485	4369	4252	4135	4019	0	150	148	146	144	142	140	138	136	134	132	
10	4827	4710	4593	4476	4360	4243	4126	4009	10	131	129	127	125	123	121	119	117	115	113	0′ 20
20	4818	4701	4585	4468	4351	4234	4117	4000	20	111	109	107	105	103	101	99	97	95	93	1 19
30	4810	4693	4576	4459	4342	4225	4108	3991	30	91	90	88	86	84	82	80	78	76	74	2 18
40	4802	4685	4567	4450	4333	4216	4099	3981	40	72	70	68	66	64	62	60	58	56	54	3 17
50	4794	4676	4559	4442	4324	4207	4090	3972	50	53	51	49	47	45	43	41	39	37	35	4 17
66° 0′	4.294786	4668	4551	4433	4316	4198	4081	3963	0	150	148	146	144	142	140	138	136	134	132	5 16
10	4778	4660	4542	4425	4307	4189	4072	3954	10	130	128	126	124	122	121	119	117	115	113	6 15
20	4770	4652	4534	4416	4298	4180	4063	3945	20	111	109	107	105	103	101	99	97	95	93	7 14
30	4762	4644	4526	4408	4290	4172	4054	3936	30	91	89	87	85	83	81	79	77	75	73	8 13
40	4754	4636	4517	4399	4281	4163	4045	3927	40	71	69	67	66	64	62	60	58	56	54	9 12
50	4746	4628	4509	4391	4273	4155	4036	3918	50	52	50	48	46	44	42	40	38	36	34	
67° 0′	4.294738	4620	4501	4383	4265	4146	4028	3909	0	150	148	146	144	142	140	138	136	134	132	
10	4730	4612	4493	4375	4256	4138	4019	3901	10	130	128	126	124	122	120	118	116	114	112	0′ 20
20	4723	4604	4485	4367	4248	4129	4011	3892	20	110	108	106	104	102	100	98	97	95	93	1 19
30	4715	4596	4477	4359	4240	4121	4002	3883	30	91	89	87	85	83	81	79	77	75	73	2 18
40	4708	4589	4470	4351	4232	4113	3994	3875	40	71	69	67	65	63	61	59	57	55	53	3 18
50	4700	4581	4462	4343	4224	4105	3985	3866	50	51	49	47	45	43	41	39	37	35	33	4 17
68° 0′	4.294693	4573	4454	4335	4216	4096	3977	3858	0	150	148	146	144	142	140	138	136	134	132	5 16
10	4685	4566	4446	4327	4208	4088	3969	3849	10	130	128	126	124	122	120	118	116	114	112	6 15
20	4678	4558	4439	4319	4200	4080	3961	3841	20	110	108	106	104	102	100	98	96	94	92	7 14
30	4671	4551	4431	4312	4192	4072	3953	3833	30	90	88	86	84	82	80	78	76	74	72	8 14
40	4663	4543	4424	4304	4184	4064	3944	3825	40	70	68	66	64	62	60	58	56	54	52	9 13
50	4656	4536	4416	4296	4176	4056	3936	3817	50	50	48	46	44	42	40	38	36	34	32	
69° 0′	4.294649	4529	4409	4289	4169	4049	3929	3808	0	150	148	146	144	142	140	138	136	134	132	
10	4642	4522	4401	4281	4161	4041	3921	3800	10	130	128	126	124	122	120	118	116	114	112	0′ 20
20	4635	4514	4394	4274	4153	4033	3913	3793	20	110	108	106	104	102	100	98	96	94	92	1 19
30	4628	4507	4387	4266	4146	4026	3905	3785	30	90	88	86	84	82	80	78	76	74	72	2 19
40	4621	4500	4380	4259	4139	4018	3897	3777	40	70	68	66	64	62	60	58	56	54	52	3 18
50	4614	4493	4373	4252	4131	4012	3890	3769	50	50	48	46	44	42	40	38	36	34	32	4 17
70° 0′	4.294607	4486	4366	4245	4124	1003	3882	3761	0	150	148	146	144	142	140	138	136	134	132	5 16
10	4600	4479	4359	4238	4117	3996	3875	3754	10	130	128	126	124	122	120	118	116	114	112	6 16
20	4594	4473	4352	4231	4109	3988	3867	3746	20	110	108	106	104	102	100	98	96	93	91	7 15
30	4587	4466	4345	4224	4102	3981	3860	3739	30	89	87	85	83	81	79	77	75	73	71	8 14
40	4580	4459	4338	4217	4095	3974	3853	3731	40	69	67	65	63	61	59	57	55	53	51	9 13
50	4574	4452	4331	4210	4088	3967	3845	3724	50	49	47	45	43	41	39	37	35	33	31	
71° 0′	4.294567	4446	4324	4203	4081	3960	3838	3717	0	150	148	146	144	142	140	138	136	134	132	
10	4561	4439	4318	4196	4074	3953	3831	3709	10	130	128	126	124	122	120	118	115	113	111	0′ 20
20	4555	4433	4311	4189	4067	3946	3824	3702	20	109	107	105	103	101	99	97	95	93	91	1 19
30	4548	4426	4304	4184	4061	3939	3817	3695	30	89	87	85	83	81	79	77	75	73	71	2 19
40	4542	4420	4298	4176	4054	3932	3810	3688	40	69	67	65	63	61	59	57	55	53	51	3 18
50	4536	4414	4291	4169	4047	3925	3803	3681	50	48	46	44	42	40	38	36	34	32	30	4 17
72° 0′	4.294530	4407	4285	4163	4041	3918	3796	3674	0	150	148	146	144	142	140	138	136	134	132	5 17
10	4524	4401	4279	4156	4034	3912	3789	3667	10	130	128	125	123	121	119	117	115	113	111	6 16
20	4518	4395	4273	4150	4028	3905	3783	3660	20	109	107	105	103	101	99	97	95	93	91	7 15
30	4512	4389	4266	4144	4021	3898	3776	3653	30	89	87	85	83	81	78	76	74	72	70	8 15
40	4506	4383	4260	4137	4015	3892	3769	3647	40	68	66	64	62	60	58	56	54	52	50	9 14
50	4500	4377	4254	4131	4008	3886	3763	3640	50	48	46	44	42	40	38	36	33	31	29	

App. Alt. of ☉ or ✱	° 3	° 4	° 5	° 6	° 7	° 8	° 9	° 10	° 12	° 14	° 16	° 18	° 20	° 22	° 24	° 26	° 28	° 30	° 32	° 34	° 36	° 38	° 40	° 45	° 50	° 55	° 60	° 65	° 70	° 75	° 80	° 85	° 90
Add for ☉'s Alt.	2	11	16	19	21	22	23	23	24	24	24	23	22	22	21	21	20	20	19	19	18	18	17	16	15	14	13	13	12	12	11	11	
Add for ✱'s Alt.	3	12	18	21	23	24	25	26	27	28	29	29	29	29	29	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	

Correction of the Moon's Apparent Altitude.

☽'s App. Alt.	Moon's Horizontal Parallax.								Add for Seconds of Parallax.										Add for Minutes of Alt.
	54′	55′	56′	57′	58′	59′	60′	61′		0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″	″	″	″	″	″	″	″	″	″	″	
73° 0′	15 20	15 37	15 55	16 12	16 30	16 48	17 5	17 23	0	0	0	1	1	1	1	2	2	2	3	
10	15 11	15 28	15 46	16 3	16 21	16 38	16 55	17 13	10	3	3	3	4	4	4	5	5	5	5	0′ 10″
20	15 2	15 19	15 37	15 54	16 11	16 28	16 45	17 3	20	6	6	6	7	7	7	7	8	8	8	1 9
30	14 53	15 10	15 27	15 44	16 1	16 19	16 36	16 53	30	9	9	9	9	10	10	10	11	11	11	2 8
40	14 45	15 1	15 18	15 35	15 52	16 9	16 26	16 43	40	11	12	12	12	12	13	13	13	14	14	3 7
50	14 36	14 52	15 9	15 26	15 42	15 59	16 16	16 33	50	14	14	15	15	15	16	16	16	16	17	4 6
74° 0′	14 27	14 43	15 0	15 16	15 33	15 49	16 6	16 22	0	0	0	1	1	1	1	2	2	2	2	5 5
10	14 18	14 34	14 50	15 7	15 23	15 40	15 56	16 12	10	3	3	3	3	4	4	4	5	5	5	6 4
20	14 9	14 25	14 41	14 58	15 14	15 30	15 46	16 2	20	5	6	6	6	6	7	7	7	7	8	7 3
30	14 0	14 16	14 32	14 48	15 4	15 20	15 36	15 52	30	8	8	9	9	9	9	10	10	10	10	8 2
40	13 51	14 7	14 23	14 39	14 55	15 10	15 26	15 42	40	11	11	11	11	12	12	12	12	13	13	9 1
50	13 42	13 58	14 14	14 29	14 45	15 1	15 16	15 32	50	13	14	14	14	14	15	15	15	15	16	
75° 0′	13 33	13 49	14 4	14 20	14 35	14 51	15 6	15 22	0	0	0	1	1	1	1	2	2	2	2	
10	13 24	13 40	13 55	14 10	14 26	14 41	14 57	15 12	10	3	3	3	3	4	4	4	4	5	5	0′ 10″
20	13 15	13 31	13 46	14 1	14 16	14 31	14 47	15 2	20	5	5	6	6	6	6	7	7	7	7	1 9
30	13 6	13 21	13 37	13 52	14 7	14 22	14 37	14 52	30	8	8	8	8	9	9	9	9	10	10	2 8
40	12 58	13 12	13 27	13 42	13 57	14 12	14 27	14 42	40	10	10	11	11	11	11	12	12	12	12	3 7
50	12 49	13 3	13 18	13 33	13 47	14 2	14 17	14 31	50	13	13	13	13	14	14	14	14	15	15	4 6
76° 0′	12 40	12 54	13 9	13 23	13 38	13 52	14 7	14 21	0	0	0	0	1	1	1	1	2	2	2	5 5
10	12 31	12 45	12 59	13 14	13 28	13 42	13 57	14 11	10	2	3	3	3	3	4	4	4	4	4	6 4
20	12 22	12 36	12 50	13 4	13 18	13 33	13 47	14 1	20	5	5	5	5	6	6	6	6	7	7	7 3
30	12 13	12 27	12 41	12 55	13 9	13 23	13 37	13 51	30	7	7	7	8	8	8	8	9	9	9	8 2
40	12 4	12 17	12 31	12 45	12 59	13 13	13 26	13 41	40	9	10	10	10	10	10	11	11	11	11	9 1
50	11 55	12 8	12 22	12 35	12 49	13 3	13 16	13 31	50	12	12	12	12	13	13	13	13	14	14	
77° 0′	11 46	11 59	12 13	12 26	12 40	12 53	13 6	13 20	0	0	0	0	1	1	1	1	2	2	2	
10	11 37	11 49	12 3	12 16	12 30	12 43	12 56	13 10	10	2	2	3	3	3	3	4	4	4	4	0′ 10″
20	11 28	11 40	11 54	12 7	12 20	12 33	12 46	13 0	20	4	5	5	5	5	6	6	6	6	6	1 9
30	11 19	11 31	11 44	11 57	12 11	12 24	12 36	12 50	30	7	7	7	7	8	8	8	8	8	9	2 8
40	11 10	11 22	11 35	11 48	12 1	12 14	12 26	12 40	40	9	9	9	9	10	10	10	10	10	11	3 7
50	11 1	11 13	11 26	11 38	11 51	12 4	12 16	12 29	50	11	11	11	12	12	12	12	12	13	13	4 6
78° 0′	10 51	11 4	11 16	11 29	11 41	11 54	12 6	12 19	0	0	0	0	1	1	1	1	1	2	2	5 5
10	10 42	10 55	11 7	11 19	11 32	11 44	11 56	12 9	10	2	2	2	3	3	3	3	3	4	4	6 4
20	10 33	10 45	10 58	11 10	11 22	11 34	11 46	11 58	20	4	4	4	5	5	5	5	6	6	7	7 3
30	10 24	10 36	10 48	11 0	11 12	11 24	11 36	11 48	30	6	6	6	7	7	7	7	7	8	8	8 2
40	10 15	10 27	10 39	10 51	11 2	11 14	11 26	11 38	40	8	8	8	9	9	9	9	9	10	10	9 1
50	10 6	10 18	10 29	10 41	10 53	11 4	11 16	11 28	50	10	10	10	11	11	11	11	11	12	12	
79° 0′	9 57	10 9	10 20	10 31	10 43	10 54	11 6	11 17	0	0	0	0	1	1	1	1	1	1	2	
10	9 48	9 59	10 11	10 22	10 33	10 44	10 56	11 7	10	2	2	2	2	3	3	3	3	3	3	0′ 10″
20	9 39	9 50	10 1	10 12	10 23	10 34	10 46	10 57	20	4	4	4	4	4	5	5	5	5	5	1 9
30	9 30	9 41	9 52	10 3	10 14	10 25	10 35	10 46	30	5	6	6	6	6	6	7	7	7	7	2 8
40	9 21	9 32	9 42	9 53	10 4	10 15	10 25	10 36	40	7	7	8	8	8	8	8	9	9	9	3 7
50	9 12	9 22	9 33	9 43	9 54	10 5	10 15	10 26	50	9	9	9	10	10	10	10	10	11	11	4 6
80° 0′	9 3	9 13	9 23	9 34	9 44	9 55	10 5	10 16	0	0	0	0	0	1	1	1	1	1	1	5 5
10	8 53	9 4	9 14	9 24	9 34	9 45	9 55	10 5	10	2	2	2	2	2	2	3	3	3	3	6 4
20	8 44	8 54	9 4	9 15	9 25	9 35	9 45	9 55	20	3	3	4	4	4	4	4	5	5	5	7 3
30	8 35	8 45	8 55	9 5	9 15	9 25	9 35	9 45	30	5	5	5	5	6	6	6	6	6	6	8 2
40	8 26	8 36	8 46	8 55	9 5	9 15	9 24	9 34	40	7	7	7	7	7	7	8	8	8	8	9 1
50	8 17	8 27	8 36	8 46	8 55	9 5	9 14	9 24	50	8	8	9	9	9	9	9	9	10	10	
81° 0′	8 8	8 17	8 27	8 36	8 45	8 55	9 4	9 14	0	0	0	0	0	1	1	1	1	1	1	
10	7 59	8 8	8 17	8 26	8 36	8 45	8 54	9 3	10	1	2	2	2	2	2	3	3	3	3	0′ 10″
20	7 50	7 59	8 8	8 17	8 26	8 35	8 44	8 53	20	3	3	3	3	4	4	4	4	4	4	1 9
30	7 40	7 49	7 58	8 7	8 16	8 25	8 34	8 42	30	4	5	5	5	5	5	5	6	6	6	2 8
40	7 31	7 40	7 49	7 57	8 6	8 15	8 23	8 32	40	6	6	6	6	7	7	7	7	7	7	3 7
50	7 22	7 31	7 39	7 48	7 56	8 5	8 13	8 22	50	7	8	8	8	8	8	8	8	9	9	4 6
82° 0′	7 13	7 21	7 30	7 38	7 46	7 55	8 3	8 11	0	0	0	0	0	1	1	1	1	1	1	5 5
10	7 4	7 12	7 20	7 28	7 36	7 45	7 53	8 1	10	1	1	2	2	2	2	2	2	2	2	6 4
20	6 55	7 3	7 11	7 19	7 27	7 35	7 43	7 51	20	3	3	3	3	3	3	3	4	4	4	7 3
30	6 45	6 53	7 1	7 9	7 17	7 25	7 32	7 40	30	4	4	4	4	5	5	5	5	5	5	8 2
40	6 36	6 44	6 52	6 59	7 7	7 15	7 22	7 30	40	5	5	5	6	6	6	6	6	6	6	9 1
50	6 27	6 35	6 42	6 49	6 57	7 4	7 12	7 19	50	7	7	7	7	7	7	7	7	8	8	

TABLE XXII.

Logarithms of the Moon's Apparent Altitude.

☽'s App. Alt.	MOON'S HORIZONTAL PARALLAX.							
	54′	55′	56′	57′	58′	59′	60′	61′
73° 0′	4.294494	4371	4248	4125	4002	3879	3756	3633
10	4488	4365	4242	4119	3996	3873	3750	3627
20	4482	4359	4236	4113	3990	3867	3743	3620
30	4477	4353	4230	4107	3984	3860	3737	3614
40	4471	4348	4224	4101	3978	3854	3731	3608
50	4466	4342	4219	1095	3972	3848	3725	3601
74° 0′	4.294460	4336	4213	4089	3966	3842	3719	3595
10	4455	4331	4207	4084	3960	3836	3713	3589
20	4449	4325	4202	4078	3954	3830	3707	3583
30	4444	4320	4196	4072	3948	3825	3701	3577
40	4439	4315	4191	4067	3943	3819	3695	3571
50	4433	4309	4185	4061	3937	3813	3689	3565
75° 0′	4.294428	4304	4180	4056	3932	3807	3683	3559
10	4423	4299	4175	4050	3926	3802	3678	3553
20	4418	4294	4169	4045	3921	3796	3672	3548
30	4413	4289	4164	4040	3915	3791	3667	3542
40	4408	4284	4159	4035	3910	3786	3661	3537
50	4403	4279	4154	4029	3905	3780	3656	3531
76° 0′	4.294398	4274	4149	4024	3900	3775	3650	3525
10	4394	4269	4144	4019	3894	3770	3645	3520
20	4389	4264	4139	4014	3889	3765	3640	3515
30	4384	4259	4134	4009	3884	3759	3634	3509
40	4380	4255	4130	4004	3879	3754	3629	3504
50	4375	4250	4125	4000	3875	3749	3624	3499
77° 0′	4.294371	4245	4120	3995	3870	3744	3619	3494
10	4366	4241	4115	3990	3865	3740	3614	3489
20	4362	4236	4111	3986	3860	3735	3609	3484
30	4357	4232	4106	3981	3856	3730	3605	3479
40	4353	4228	4102	3976	3851	3725	3600	3474
50	4349	4223	4098	3972	3846	3721	3595	3470
78° 0′	4.294345	4219	4093	3968	3842	3716	3591	3465
10	4341	4215	4089	3963	3838	3712	3586	3460
20	4337	4211	4085	3959	3833	3707	3582	3456
30	4333	4207	4081	3955	3829	3703	3577	3451
40	4329	4203	4077	3951	3825	3699	3573	3447
50	4325	4199	4073	3947	3821	3695	3569	3443
79° 0′	4.294321	4195	4069	3943	3817	3691	3564	3438
10	4317	4191	4065	3939	3813	3686	3560	3434
20	4314	4187	4061	3935	3809	3682	3556	3430
30	4310	4184	4057	3931	3805	3678	3552	3426
40	4306	4180	4054	3927	3801	3674	3548	3422
50	4303	4176	4050	3923	3797	3670	3544	3418
80° 0′	4.294299	4172	4046	3920	3793	3667	3540	3414
10	4296	4169	4043	3916	3790	3663	3536	3410
20	4293	4166	4039	3913	3786	3659	3533	3406
30	4289	4162	4036	3909	3782	3656	3529	3402
40	4286	4159	4032	3906	3779	3652	3525	3398
50	4283	4156	4029	3902	3775	3649	3522	3395
81° 0′	4.294280	4153	4026	3899	3772	3645	3518	3391
10	4277	4150	4023	3896	3769	3642	3515	3388
20	4274	4147	4019	3892	3765	3638	3511	3384
30	4271	4144	4016	3889	3762	3635	3508	3381
40	4268	4141	4013	3886	3759	3632	3505	3378
50	4265	4138	4010	3883	3756	3629	3502	3375
82° 0′	4.294262	4135	4008	3880	3753	3626	3499	3372
10	4259	4132	4005	3877	3750	3623	3496	3369
20	4257	4129	4002	3875	3747	3620	3493	3366
30	4254	4127	3999	3872	3745	3617	3490	3363
40	4251	4124	3997	3869	3742	3614	3487	3360
50	4249	4122	3994	3867	3739	3612	3484	3357

Add for Seconds of Parallax.										
″	0″	1″	2″	3″	4″	5″	6″	7″	8″	9″
0	150	148	146	144	142	140	138	136	134	132
10	129	127	125	123	121	119	117	115	113	111
20	109	107	105	103	101	99	97	95	92	90
30	88	86	84	82	80	78	76	74	72	70
40	68	66	64	62	60	58	55	53	51	49
50	47	45	43	41	39	37	35	33	31	29
0	150	148	146	144	142	140	138	136	133	131
10	129	127	125	123	121	119	117	115	113	111
20	109	107	105	103	100	98	96	94	92	90
30	88	86	84	82	80	78	76	74	72	69
40	67	65	63	61	59	57	55	53	51	49
50	47	45	43	41	38	36	34	32	30	28
0	150	148	146	144	142	140	138	136	133	131
10	129	127	125	123	121	119	117	115	113	111
20	109	106	104	102	100	98	96	94	92	90
30	88	86	84	82	80	78	75	73	71	69
40	67	65	63	61	59	57	55	53	50	48
50	46	44	42	40	38	36	34	32	30	28
0	150	148	146	144	142	140	138	136	133	131
10	129	127	125	123	121	119	117	115	113	110
20	108	106	104	102	100	98	96	94	92	90
30	87	85	83	81	79	77	75	73	71	69
40	67	65	63	61	58	56	54	52	50	48
50	46	44	42	40	38	36	33	31	29	27
0	150	148	146	144	142	140	137	135	133	131
10	129	127	125	123	121	119	117	114	112	110
20	108	106	104	102	100	98	96	94	91	89
30	87	85	83	81	79	77	75	73	71	68
40	66	64	62	60	58	56	54	52	50	48
50	45	43	41	39	37	35	33	31	29	27
0	150	148	146	144	142	140	137	135	133	131
10	129	127	125	123	121	119	116	114	112	110
20	108	106	104	102	100	98	95	93	91	89
30	87	85	83	81	79	77	74	72	70	68
40	66	64	62	60	58	56	54	51	49	47
50	45	43	41	39	37	35	32	30	28	26
0	150	148	146	144	142	139	137	135	133	131
10	129	127	125	123	121	118	116	114	112	110
20	108	106	104	102	100	97	95	93	91	89
30	87	85	83	81	78	76	74	72	70	68
40	66	64	62	59	57	55	53	51	49	47
50	45	43	40	38	36	34	32	30	28	26
0	150	148	146	144	142	139	137	135	133	131
10	129	127	125	123	120	118	116	114	112	110
20	108	106	104	101	99	97	95	93	91	89
30	87	85	82	80	78	76	74	72	70	68
40	66	63	61	59	57	55	53	51	49	46
50	44	42	40	38	36	34	32	30	27	25
0	150	148	146	144	142	139	137	135	133	131
10	129	127	125	122	120	118	116	114	112	110
20	108	106	103	101	99	97	95	93	91	89
30	86	84	82	80	78	76	74	72	70	67
40	65	63	61	59	57	55	53	50	48	46
50	44	42	40	38	36	34	31	29	27	25
0	150	148	146	144	142	139	137	135	133	131
10	129	127	125	122	120	118	116	114	112	110
20	108	105	103	101	99	97	95	93	91	89
30	86	84	82	80	78	76	74	72	69	67
40	65	63	61	59	57	55	52	50	48	46
50	44	42	40	38	36	33	31	29	27	25

Add for Minutes of Alt.
0′ 20
1 19
2 19
3 18
4 18
5 17
6 16
7 16
8 15
9 15
0′ 20
1 19
2 19
3 18
4 18
5 17
6 17
7 16
8 16
9 15
0′ 20
1 20
2 19
3 19
4 18
5 18
6 17
7 17
8 16
9 16
0′ 20
1 20
2 19
3 19
4 19
5 18
6 18
7 17
8 17
9 17
0′ 20
1 20
2 19
3 19
4 19
5 19
6 18
7 18
8 18
9 17

App. Alt. of ☉ or ✱	° 3	° 4	° 5	° 6	° 7	° 8	° 9	° 10	° 12	° 14	° 16	° 18	° 20	° 22	° 24	° 26	° 28	° 30	° 32	° 34	° 36	° 38	° 40	° 45	° 50	° 55	° 60	° 65	° 70	° 75	° 80	° 85	° 90
Add for ☉'s Alt.	2	11	16	19	21	22	23	23	24	24	24	23	22	22	21	21	21	20	20	19	19	19	18	17	16	15	14	13	13	12	12	11	11
Add for ✱'s Alt.	3	12	18	21	23	24	25	26	27	28	29	29	29	29	29	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

Correction of the Moon's Apparent Altitude.

☽'s App. Alt.	MOON'S HORIZONTAL PARALLAX.							
	54′	55′	56′	57′	58′	59′	60′	61′
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
83° 0′	6 18	6 25	6 32	6 40	6 47	6 54	7 2	7 9
10	6 9	6 16	6 23	6 30	6 37	6 44	6 52	6 59
20	6 0	6 6	6 13	6 20	6 27	6 34	6 41	6 48
30	5 50	5 57	6 4	6 11	6 17	6 24	6 31	6 38
40	5 41	5 48	5 54	6 1	6 8	6 14	6 21	6 27
50	5 32	5 39	5 45	5 51	5 58	6 4	6 11	6 17
84° 0′	5 22	5 29	5 35	5 42	5 48	5 54	6 0	6 7
10	5 13	5 20	5 26	5 32	5 38	5 44	5 50	5 56
20	5 4	5 10	5 16	5 22	5 28	5 34	5 40	5 46
30	4 55	5 1	5 7	5 12	5 18	5 24	5 30	5 35
40	4 46	4 51	4 57	5 3	5 8	5 14	5 19	5 25
50	4 37	4 42	4 47	4 53	4 58	5 4	5 9	5 14
85° 0′	4 27	4 33	4 38	4 43	4 48	4 54	4 59	5 4
10	4 18	4 23	4 28	4 33	4 38	4 43	4 49	4 54
20	4 9	4 14	4 19	4 24	4 28	4 33	4 38	4 43
30	4 0	4 4	4 9	4 14	4 19	4 23	4 28	4 33
40	3 51	3 55	4 0	4 4	4 9	4 13	4 18	4 22
50	3 41	3 46	3 50	3 54	3 59	4 3	4 7	4 12
86° 0′	3 32	3 36	3 40	3 45	3 49	3 53	3 57	4 1
10	3 23	3 27	3 31	3 35	3 39	3 43	3 47	3 51
20	3 14	3 17	3 21	3 25	3 29	3 33	3 37	3 40
30	3 4	3 8	3 12	3 15	3 19	3 23	3 26	3 30
40	2 55	2 59	3 2	3 5	3 9	3 13	3 16	3 19
50	2 46	2 49	2 52	2 55	2 59	3 2	3 6	3 9
87° 0′	2 37	2 40	2 43	2 46	2 49	2 52	2 55	2 59
10	2 27	2 30	2 33	2 36	2 39	2 42	2 45	2 48
20	2 18	2 20	2 23	2 26	2 29	2 32	2 35	2 38
30	2 9	2 11	2 14	2 17	2 19	2 22	2 25	2 27
40	2 0	2 2	2 4	2 7	2 9	2 12	2 14	2 17
50	1 50	1 53	1 55	1 57	1 59	2 2	2 4	2 6
88° 0′	1 41	1 43	1 45	1 47	1 49	1 52	1 54	1 56
10	1 32	1 34	1 36	1 38	1 40	1 41	1 43	1 45
20	1 23	1 24	1 26	1 28	1 30	1 31	1 33	1 35
30	1 13	1 15	1 16	1 18	1 20	1 21	1 23	1 24
40	1 4	1 5	1 7	1 8	1 10	1 11	1 12	1 14
50	0 55	56	0 57	0 58	1 0	1 1	1 2	1 3
89° 0′	0 46	0 47	0 48	0 49	0 50	0 51	0 52	0 53
10	0 36	0 37	0 38	0 39	0 40	0 41	0 42	0 42
20	0 27	0 28	0 28	0 29	0 30	0 31	0 31	0 32
30	0 18	0 18	0 18	0 19	0 20	0 20	0 21	0 22
40	0 9	0 9	0 9	0 10	0 10	0 10	0 11	0 11
50	0 0	0 9	0 0	0 0	0 0	0 0	0 0	0 0

Add for Seconds of Parallax.										
	0″	1″	2″	3″	4″	5″	6″	7″	8″	9″
″	″	″	″	″	″	″	″	″	″	″
0	0	0	0	0	0	1	1	1	1	1
10	1	1	1	1	2	2	2	2	2	2
20	2	2	2	3	3	3	3	3	3	3
30	3	4	4	4	4	4	4	4	4	4
40	5	5	5	5	5	5	5	5	6	6
50	6	6	6	6	6	6	6	6	7	7
0	0	0	0	0	0	0	1	1	1	1
10	1	1	1	1	1	2	2	2	2	2
20	2	2	2	2	2	2	3	3	3	3
30	3	3	3	3	3	3	4	4	4	4
40	4	4	4	4	4	4	5	5	5	
50	5	5	5	5	5	5	5	6	6	
0	0	0	0	0	0	0	1	1	1	
10	1	1	1	1	1	1	1	1	1	
20	2	2	2	2	2	2	2	2	2	
30	2	2	3	3	3	3	3	3	3	
40	3	3	3	3	3	4	4	4	4	
50	4	4	4	4	4	4	4	5	5	
0	0	0	0	0	0	0	0	0	1	
10	1	1	1	1	1	1	1	1	1	
20	2	2	2	2	2	2	2	2	2	
30	2	2	3	3	3	3	3	3	3	
40	3	3	3	3	3	4	4	4	4	
50	4	4	4	4	4	4	4	5	5	
0	0	0	0	0	0	0	0	0	1	
10	1	1	1	1	1	1	1	1	1	
20	1	1	1	1	1	2	2	2	2	
30	2	2	2	2	2	2	2	2	2	
40	2	3	3	3	3	3	3	3	3	
50	3	3	3	3	3	3	3	4	4	
0	0	0	0	0	0	0	0	0	0	
10	0	1	1	1	1	1	1	1	1	
20	1	1	1	1	1	1	1	1	1	
30	1	1	1	1	2	2	2	2	2	
40	2	2	2	2	2	2	2	2	2	
50	2	2	2	2	2	2	2	3	3	
0	0	0	0	0	0	0	0	0	0	
10	0	0	0	0	0	0	0	0	0	
20	1	1	1	1	1	1	1	1	1	
30	1	1	1	1	1	1	1	1	1	
40	1	1	1	1	1	1	1	1	2	
50	1	1	1	1	1	1	1	2	2	
0	0	0	0	0	0	0	0	0	0	
10	0	0	0	0	0	0	0	0	0	
20	0	0	0	0	0	0	0	0	0	
30	0	0	0	0	0	0	0	0	0	
40	0	0	0	0	0	0	0	0	0	
50	1	1	1	1	1	1	1	1	1	

Add for Minutes of Alt.	
0′	10″
1	9
2	8
3	7
4	6
5	5
6	4
7	3
8	2
9	1
0′	10″
1	9
2	8
3	7
4	6
5	5
6	4
7	3
8	2
9	1
0′	10″
1	9
2	8
3	7
4	6
5	5
6	4
7	3
8	2
9	1
0′	10″
1	9
2	8
3	7
4	6
5	5
6	4
7	3
8	2
9	1
0′	10″
1	9
2	8
3	7
4	6
5	5

TABLE XXII.

Logarithms of the Moon's Apparent Altitude.

☽'s App. Alt.	Moon's Horizontal Parallax. 54′	55′	56′	57′	58′	59′	60′	61′	Add for Seconds of Parallax. ″	0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	Add for Minutes of Alt.
83° 0′	4.294247	4119	3992	3864	3737	3609	3482	3354	0	150	148	146	144	142	139	137	135	133	131	
10	4244	4117	3989	3862	3734	3606	3479	3351	10	129	127	124	122	120	118	116	114	112	110	0′ 20
20	4242	4114	3987	3859	3731	3604	3476	3349	20	108	105	103	101	99	97	95	93	90	88	1 20
30	4240	4112	3984	3857	3729	3601	3474	3346	30	86	84	82	80	78	76	73	71	69	67	2 20
40	4237	4110	3982	3854	3727	3599	3471	3344	40	65	63	61	59	56	54	52	50	48	46	3 19
50	4235	4108	3980	3852	3724	3597	3469	3341	50	44	42	39	37	35	33	31	29	27	25	4 19
84° 0′	4.294233	4105	3978	3850	3722	3594	3467	3339	0	150	148	146	144	141	139	137	135	133	131	5 19
10	4231	4103	3975	3848	3720	3592	3464	3337	10	129	127	124	122	120	118	116	114	112	110	6 19
20	4229	4101	3973	3846	3718	3590	3462	3334	20	107	105	103	101	99	97	95	93	90	88	7 18
30	4227	4099	3971	3844	3716	3588	3460	3332	30	86	84	82	80	78	75	73	71	69	67	8 18
40	4225	4097	3969	3842	3714	3586	3458	3330	40	65	63	60	58	56	54	52	50	48	46	9 18
50	4223	4095	3967	3840	3712	3584	3456	3328	50	43	41	39	37	35	33	31	29	26	24	
85° 0′	4.294222	4094	3966	3838	3710	3582	3454	3326	0	150	148	146	144	141	139	137	135	133	131	
10	4220	4092	3964	3836	3708	3580	3452	3324	10	129	127	124	122	120	118	116	114	112	109	0′ 20
20	4218	4090	3962	3834	3706	3578	3450	3322	20	107	105	103	101	99	97	95	92	90	88	1 20
30	4217	4089	3960	3832	3704	3576	3448	3320	30	86	84	82	80	78	75	73	71	69	67	2 20
40	4215	4087	3959	3831	3703	3575	3447	3319	40	65	62	60	58	56	54	52	50	47	45	3 20
50	4214	4085	3957	3829	3701	3573	3445	3317	50	43	41	39	37	35	33	30	28	26	24	4 19
86° 0′	4.294212	4084	3956	3828	3700	3572	3443	3315	0	150	148	146	144	141	139	137	135	133	131	5 19
10	4211	4083	3954	3826	3698	3570	3442	3314	10	129	127	124	122	120	118	116	114	112	109	6 19
20	4209	4081	3953	3825	3697	3569	3440	3312	20	107	105	103	101	99	97	95	92	90	88	7 19
30	4208	4080	3952	3824	3695	3567	3439	3311	30	86	84	82	80	77	75	73	71	69	67	8 19
40	4207	4079	3950	3822	3694	3566	3438	3309	40	65	62	60	58	56	54	52	50	47	45	9 19
50	4206	4078	3949	3821	3693	3565	3436	3308	50	43	41	39	37	35	33	30	28	26	24	
87° 0′	4.294205	4077	3948	3820	3692	3564	3435	3307	0	150	148	146	144	141	139	137	135	133	131	
10	4204	4076	3947	3819	3691	3563	3434	3306	10	129	126	124	122	120	118	116	114	112	109	0′ 20
20	4203	4075	3946	3818	3690	3562	3433	3305	20	107	105	103	101	99	97	94	92	90	88	1 20
30	4202	4074	3945	3817	3689	3561	3432	3304	30	86	84	82	79	77	75	73	71	69	67	2 20
40	4201	4073	3945	3816	3688	3560	3431	3303	40	65	62	60	58	56	54	52	49	47	45	3 20
50	4200	4072	3944	3815	3687	3559	3430	3302	50	43	41	39	37	35	32	30	28	26	24	4 20
88° 0′	4.294200	4071	3943	3815	3686	3558	3430	3301	0	150	148	146	144	141	139	137	135	133	131	5 20
10	4199	4071	3942	3814	3686	3557	3429	3300	10	129	126	124	122	120	118	116	114	112	109	6 20
20	4199	4070	3942	3813	3685	3557	3428	3300	20	107	105	103	101	99	97	94	92	90	88	7 19
30	4198	4070	3941	3813	3684	3556	3428	3299	30	86	84	82	79	77	75	73	71	69	67	8 19
40	4197	4069	3941	3812	3684	3555	3427	3299	40	65	62	60	58	56	54	52	49	47	45	9 19
50	4197	4069	3940	3812	3683	3555	3427	3298	50	43	41	39	37	35	32	30	28	26	24	
89° 0′	4.294197	4068	3940	3811	3683	3555	3426	3298	0	150	148	146	144	141	139	137	135	133	131	0′ 20
10	4196	4068	3939	3811	3683	3554	3426	3297	10	129	126	124	122	120	118	116	114	112	109	1 20
20	4196	4068	3939	3811	3682	3554	3425	3297	20	107	105	103	101	99	97	94	92	90	88	2 20
30	4196	4067	3939	3811	3682	3554	3425	3297	30	86	84	82	79	77	75	73	71	69	67	3 20
40	4196	4067	3939	3810	3682	3553	3425	3297	40	65	62	60	58	56	54	52	49	47	45	4 20
50	4196	4067	3939	3810	3682	3553	3425	3296	50	43	41	39	37	35	32	30	28	26	24	5 20

App. Alt. of ☉ or ✱	° 3	° 4	° 5	° 6	° 7	° 8	° 9	° 10	° 12	° 14	° 16	° 18	° 20	° 22	° 24	° 26	° 28	° 30	° 32	° 34	° 36	° 38	° 40	° 45	° 50	° 55	° 60	° 65	° 70	° 75	° 80	° 85	° 90
Add for ☉'s Alt.	2	11	16	19	21	22	23	23	24	24	24	23	22	22	21	21	21	20	20	19	19	19	18	17	16	15	14	13	13	12	12	11	11
Add for ✱'s Alt.	3	12	18	21	23	24	25	26	27	28	29	29	29	29	29	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

TABLE XXIII.

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE. 0°	1°	2°	3°	4°	5°	6°	7°	M.
0		8.940842	9.241855	9.417919	9.542819	9.639680	9.718800	9.785675	0
1	7.162696	948020	245459	420324	544624	641124	720004	786707	1
2	463726	955082	249033	422717	546422	642563	721204	787736	2
3	639817	962031	252578	425096	548212	643998	722401	788762	3
4	764756	968870	256094	427462	549995	645428	723595	789787	4
5	7.861666	8.975603	9.259582	9.429815	9.551770	9.646853	9.724785	9.790808	5
6	940847	982233	263042	432156	553539	648274	725972	791828	6
7	8.007794	988764	266475	434484	555300	649690	727156	792845	7
8	065786	995198	269881	436800	557054	651102	728337	793859	8
9	116938	9.001538	273260	439103	558800	652508	729514	794872	9
10	8.162696	9.007787	9.276614	9.441394	9.560540	9.653911	9.730688	9.795881	10
11	204089	013947	279941	443674	562273	655309	731859	796889	11
12	241877	020021	283243	445941	563999	656702	733027	797894	12
13	276639	026011	286521	448196	565719	658090	734192	798897	13
14	308824	031919	289773	450440	567431	659475	735353	799897	14
15	8.338787	9.037749	9.293002	9.452672	9.569137	9.660855	9.736512	9.800896	15
16	366816	043501	296207	454893	570836	662230	737667	801891	16
17	393145	049178	299388	457103	572528	663602	738820	802885	17
18	417968	054781	302546	459301	574214	664968	739969	803876	18
19	441449	060314	305681	461489	575893	666331	741115	804865	19
20	8.463725	9.065776	9.308794	9.463665	9.577566	9.667689	9.742259	9.805852	20
21	484915	071171	311885	465830	579232	669043	743399	806837	21
22	505118	076500	314954	467985	580892	670393	744536	807819	22
23	524423	081764	318001	470129	582546	671739	745670	808799	23
24	542906	086965	321027	472263	584193	673080	746801	809777	24
25	8.560635	9.092104	9.324032	9.474386	9.585834	9.674418	9.747930	9.810753	25
26	577668	097183	327016	476498	587469	675751	749055	811726	26
27	594059	102204	329980	478601	589098	677080	750178	812698	27
28	609853	107167	332924	480693	590721	678405	751297	813667	28
29	625093	112074	335848	482775	592338	679726	752414	814634	29
30	8.639816	9.116926	9.338753	9.484848	9.593948	9.681043	9.753528	9.815598	30
31	654056	121725	341638	486910	595553	682356	754639	816561	31
32	667844	126471	344504	488963	597152	683665	755747	817522	32
33	681209	131166	347352	491006	598745	684971	756852	818480	33
34	694173	135810	350180	493040	600332	686272	757955	819436	34
35	8.706762	9.140406	9.352991	9.495064	9.601913	9.687569	9.759054	9.820390	35
36	718997	144953	355783	497078	603489	688862	760151	821342	36
37	730896	149453	358558	499084	605058	690152	761245	822292	37
38	742477	153908	361315	501080	606623	691438	762337	823240	38
39	753758	158316	364054	503067	608181	692720	763425	824186	39
40	8.764754	9.162681	9.366777	9.505045	9.609734	9.693998	9.764511	9.825130	40
41	775477	167002	369482	507014	611281	695272	765594	826072	41
42	785943	171280	372171	508974	612823	696543	766675	827011	42
43	796162	175517	374843	510925	614360	697810	767752	827949	43
44	806146	179713	377499	512867	615891	699073	768827	828884	44
45	8.815905	9.183868	9.380138	9.514801	9.617417	9.700333	9.769900	9.829818	45
46	825451	187985	382762	516726	618937	701589	770970	830749	46
47	834791	192062	385370	518643	620452	702841	772037	831679	47
48	843934	196102	387962	520552	621962	704090	773101	832607	48
49	852888	200104	390539	522451	623466	705335	774163	833532	49
50	8.861662	9.204070	9.393101	9.524343	9.624965	9.706577	9.775223	9.834456	50
51	870262	208000	395647	526226	626459	707815	776279	835377	51
52	878695	211895	398179	528102	627948	709049	777333	836297	52
53	886968	215755	400696	529969	629432	710280	778385	837215	53
54	895085	219581	403199	531828	630911	711507	779434	838130	54
55	8.903054	9.223374	9.405687	9.533679	9.632385	9.712731	9.780480	9.839044	55
56	910879	227133	408161	535523	633854	713952	781524	839956	56
57	918566	230861	410621	537358	635317	715169	782566	840866	57
58	926119	234557	413068	539186	636776	716383	783605	841774	58
59	933543	238221	415500	541007	638230	717593	784641	842680	59

TABLE XXIII.

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE. 8°	9°	10°	11°	12°	13°	14°	15°	M.
0	9.843585	9.894643	9.940296	9.981573	0.019235	0.053859	0.085894	0.115698	0
1	844487	895445	941017	982228	019835	054413	086409	116177	1
2	845387	896246	941738	982883	020435	054966	086922	116656	2
3	846286	897044	942456	983536	021034	055519	087435	117135	3
4	847183	897842	943174	984189	021632	056071	087947	117613	4
5	9.848078	9.898638	9.943891	9.984840	0.022229	0.056622	0.088459	0.118090	5
6	848971	899432	944606	985491	022825	057172	088970	118567	6
7	849862	900225	945320	986140	023421	057722	089480	119043	7
8	850751	901017	946034	986789	024016	058271	089990	119519	8
9	851639	901807	946745	987437	024610	058819	090500	119994	9
10	9.852524	9.902596	9.947456	9.988083	0.025203	0.059367	0.091008	0.120469	10
11	853408	903383	948166	988729	025795	059914	091516	120943	11
12	854291	904169	948874	989374	026386	060460	092024	121417	12
13	855171	904953	949581	990017	026977	061006	092530	121890	13
14	856049	905736	950287	990660	027567	061551	093037	122362	14
15	9.856926	9.906517	9.950992	9.991302	0.028156	0.062095	0.093542	0.122835	15
16	857801	907297	951696	991943	028744	062639	094047	123306	16
17	858674	908076	952398	992583	029332	063181	094552	123777	17
18	859546	908853	953100	993222	029918	063724	095056	124248	18
19	860415	909629	953800	993860	030504	064265	095559	124718	19
20	9.861283	9.910404	9.954499	9.994497	0.031089	0.064806	0.096062	0.125187	20
21	862149	911177	955197	995133	031673	065346	096564	125656	21
22	863014	911949	955894	995768	032257	065885	097065	126125	22
23	863877	912719	956590	996402	032839	066424	097566	126593	23
24	864738	913488	957284	997036	033421	066962	098066	127060	24
25	9.865597	9.914256	9.957978	9.997668	0.034002	0.067499	0.098566	0.127527	25
26	866455	915022	958670	998299	034582	068036	099065	127993	26
27	867310	915787	959361	998930	035162	068572	099564	128459	27
28	868165	916550	960052	999560	035741	069107	100062	128925	28
29	869017	917312	960741	0.000188	036319	069642	100559	129390	29
30	9.869868	9.918073	9.961429	0.000816	0.036896	0.070176	0.101056	0.129854	30
31	870717	918833	962116	001443	037472	070709	101552	130318	31
32	871565	919591	962801	002069	038048	071243	102048	130781	32
33	872410	920348	963486	002694	038623	071774	102543	131244	33
34	873255	921103	964170	003318	039197	072305	103037	131706	34
35	9.874097	9.921858	9.964852	0.003941	0.039770	0.072836	0.103531	0.132168	35
36	874938	922610	965534	004563	040342	073366	104025	132630	36
37	875777	923362	966214	005185	040914	073896	104517	133091	37
38	876615	924112	966893	005805	041485	074424	105010	133551	38
39	877451	924861	967571	006425	042055	074952	105501	134011	39
40	9.878285	9.925609	9.968249	0.007044	0.042625	0.075480	0.105992	0.134470	40
41	879118	926355	968925	007661	043194	076007	106483	134929	41
42	879949	927100	969600	008278	043762	076533	106973	135387	42
43	880779	927844	970274	008894	044329	077058	107462	135845	43
44	881607	928587	970947	009510	044895	077583	107951	136303	44
45	9.882433	9.929328	9.971619	0.010124	0.045461	0.078107	0.108439	0.136760	45
46	883258	930068	972289	010737	046026	078631	108927	137216	46
47	884081	930806	972959	011350	046590	079154	109414	137672	47
48	884903	931544	973628	011962	047154	079676	109901	138128	48
49	885723	932280	974296	012572	047717	080198	110387	138582	49
50	9.886542	9.933015	9.974962	0.013182	0.048279	0.080719	0.110873	0.139037	50
51	887359	933749	975628	013791	048840	081239	111358	139491	51
52	888174	934481	976293	014400	049400	081759	111842	139944	52
53	888988	935212	976956	015007	049960	082278	112326	140397	53
54	889801	935942	977619	015613	050519	082797	112809	140850	54
55	9.890612	9.936671	9.978280	0.016219	0.051078	0.083314	0.113292	0.141302	55
56	891421	937398	978941	016824	051635	083832	113774	141754	56
57	892229	938125	979600	017428	052192	084348	114256	142205	57
58	893035	938850	980259	018030	052749	084864	114737	142655	58
59	893840	939573	980916	018633	053304	085380	115218	143106	59

TABLE XXIII.

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE. 16°	17°	18°	19°	20°	21°	22°	23°	M.
0	0.143555	0.169702	0.194332	0.217609	0.239670	0.260633	0.280599	0.299655	0
1	144004	170124	194731	217986	240028	260974	280924	299966	1
2	144453	170547	195129	218363	240386	261314	281248	300276	2
3	144901	170968	195527	218740	240744	261654	281573	300586	3
4	145349	171389	195925	219116	241101	261994	281897	300895	4
5	0.145797	0.171810	0.196322	0.219492	0.241458	0.262334	0.282220	0.301205	5
6	146243	172230	196719	219868	241814	262673	282544	301514	6
7	146690	172650	197115	220243	242170	263012	282867	301823	7
8	147136	173070	197511	220618	242526	263351	283190	302132	8
9	147581	173489	197907	220993	242882	263689	283513	302440	9
10	0.148026	0.173908	0.198302	0.221367	0.243237	0.264027	0.283836	0.302748	10
11	148471	174326	198697	221741	243592	264365	284158	303057	11
12	148915	174744	199091	222115	243947	264703	284480	303364	12
13	149358	175161	199486	222488	244302	265040	284802	303672	13
14	149802	175578	199879	222861	244656	265377	285124	303979	14
15	0.150244	0.175995	0.200273	0.223234	0.245010	0.265714	0.285445	0.304286	15
16	150686	176411	200666	223606	245363	266051	285766	304593	16
17	151128	176827	201059	223978	245716	266387	286087	304900	17
18	151569	177242	201451	224349	246069	266723	286408	305207	18
19	152010	177657	201843	224721	246422	267059	286728	305513	19
20	0.152451	0.178072	0.202234	0.225092	0.246775	0.267395	0.287048	0.305819	20
21	152891	178486	202626	225462	247127	267730	287368	306125	21
22	153330	178900	203017	225833	247478	268065	287687	306430	22
23	153769	179313	203407	226203	247830	268399	288007	306736	23
24	154208	179726	203797	226573	248181	268734	288326	307041	24
25	0.154646	0.180139	0.204187	0.226942	0.248532	0.269068	0.288645	0.307346	25
26	155083	180551	204577	227311	248883	269402	288964	307650	26
27	155521	180963	204966	227680	249233	269735	289282	307955	27
28	155957	181374	205354	228048	249583	270069	289600	308259	28
29	156394	181785	205743	228416	249933	270402	289918	308563	29
30	0.156830	0.182196	0.206131	0.228784	0.250282	0.270735	0.290236	0.308867	30
31	157265	182606	206519	229151	250631	271067	290553	309170	31
32	157700	183016	206906	229518	250980	271400	290870	309474	32
33	158134	183425	207293	229885	251329	271732	291187	309777	33
34	158569	183834	207679	230252	251677	272064	291504	310080	34
35	0.159002	0.184243	0.208066	0.230618	0.252025	0.272395	0.291820	0.310382	35
36	159435	184651	208452	230984	252373	272726	292137	310685	36
37	159868	185059	208837	231349	252720	273057	292453	310987	37
38	160300	185466	209222	231714	253067	273388	292768	311289	38
39	160732	185873	209607	232079	253414	273718	293084	311591	39
40	0.161164	0.186280	0.209992	0.232444	0.253761	0.274049	0.293399	0.311893	40
41	161595	186686	210376	232808	254107	274379	293714	312194	41
42	162025	187092	210760	233172	254453	274708	294029	312495	42
43	162456	187498	211143	233536	254799	275038	294344	312796	43
44	162885	187903	211526	233899	255144	275367	294658	313097	44
45	0.163314	0.188308	0.211909	0.234262	0.255489	0.275696	0.294972	0.313397	45
46	163743	188712	212291	234625	255834	276024	295286	313698	46
47	164172	189116	212673	234987	256179	276353	295600	313998	47
48	164600	189519	213055	235349	256523	276681	295913	314297	48
49	165027	189923	213437	235711	256867	277009	296226	314597	49
50	0.165454	0.190325	0.213818	0.236073	0.257211	0.277337	0.296539	0.314896	50
51	165881	190728	214198	236434	257554	277664	296852	315196	51
52	166307	191130	214579	236795	257898	277991	297164	315495	52
53	166733	191531	214959	237155	258241	278318	297476	315793	53
54	167159	191933	215338	237515	258583	278644	297788	316092	54
55	0.167584	0.192334	0.215718	0.237875	0.258925	0.278971	0.298100	0.316390	55
56	168008	192734	216097	238235	259268	279297	298412	316689	56
57	168432	193134	216475	238594	259609	279623	298723	316986	57
58	168856	193531	216854	238953	259951	279948	299034	317284	58
59	169279	193933	217232	239312	260292	280274	299345	317582	59

TABLE XXIII.

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE. 24°	25°	26°	27°	28°	29°	30°	31°	M.
0	0.317879	0.335337	0.352088	0.368185	0.383675	0.398600	0.412996	0.426899	0
1	318176	335622	352361	368448	383928	398844	413232	427126	1
2	318473	335906	352635	368711	384182	399088	413467	427354	2
3	318769	336191	352908	368974	384434	399332	413703	427581	3
4	319066	336475	353181	369236	384687	399575	413938	427809	4
5	0.319362	0.336759	0.353454	0.369499	0.384940	0.399819	0.414173	0.428036	5
6	319658	337043	353726	369761	385192	400062	414408	428263	6
7	319954	337326	353999	370023	385445	400306	414643	428490	7
8	320249	337610	354271	370285	385697	400549	414878	428717	8
9	320545	337893	354543	370546	385949	400792	415112	428943	9
10	0.320840	0.338176	0.354815	0.370808	0.386201	0.401035	0.415347	0.429170	10
11	321135	338459	355087	371069	386452	401277	415581	429396	11
12	321430	338742	355358	371330	386704	401520	415815	429623	12
13	321724	339024	355630	371591	386955	401762	416049	429849	13
14	322019	339306	355901	371852	387207	402005	416283	430075	14
15	0.322313	0.339589	0.356172	0.372113	0.387458	0.402247	0.416517	0.430301	15
16	322607	339871	356443	372373	387709	402489	416751	430527	16
17	322900	340152	356713	372634	387959	402731	416984	430752	17
18	323194	340434	356984	372894	388210	402972	417217	430978	18
19	323487	340715	357254	373154	388461	403214	417451	431203	19
20	0.323780	0.340996	0.357524	0.373414	0.388711	0.403455	0.417684	0.431429	20
21	324073	341277	357794	373674	388961	403697	417917	431654	21
22	324366	341558	358064	373933	389211	403938	418149	431879	22
23	324658	341839	358333	374192	389461	404179	418382	432104	23
24	324950	342119	358603	374452	389711	404420	418615	432329	24
25	0.325242	0.342399	0.358872	0.374711	0.389960	0.404660	0.418847	0.432553	25
26	325534	342679	359141	374970	390210	404901	419079	432778	26
27	325826	342959	359410	375228	390459	405141	419312	433002	27
28	326117	343239	359678	375487	390708	405382	419544	433226	28
29	326409	343518	359947	375745	390957	405622	419775	433450	29
30	0.326700	0.343797	0.360215	0.376003	0.391206	0.405862	0.420007	0.433675	30
31	326990	344076	360483	376261	391454	406102	420239	433898	31
32	327281	344355	360751	376519	391703	406341	420470	434122	32
33	327571	344634	361019	376777	391951	406581	420702	434346	33
34	327862	344912	361287	377035	392199	406820	420933	434569	34
35	0.328152	0.345191	0.361554	0.377292	0.392447	0.407060	0.421164	0.434793	35
36	328442	345469	361822	377549	392695	407299	421395	435016	36
37	328731	345747	362089	377806	392943	407538	421626	435239	37
38	329021	346024	362356	378063	393191	407777	421857	435462	38
39	329310	346302	362623	378320	393438	408015	422087	435685	39
40	0.329599	0.346579	0.362889	0.378577	0.393685	0.408254	0.422318	0.435908	40
41	329887	346857	363156	378833	393932	408492	422548	436131	41
42	330176	347134	363422	379089	394179	408731	422778	436353	42
43	330464	347410	363688	379345	394426	408969	423008	436576	43
44	330753	347687	363954	379601	394673	409207	423238	436798	44
45	0.331041	0.347963	0.364220	0.379857	0.394919	0.409445	0.423468	0.437020	45
46	331329	348240	364485	380113	395166	409682	423697	437242	46
47	331616	348516	364751	380368	395412	409920	423927	437464	47
48	331903	348792	365016	380624	395658	410157	424156	437686	48
49	332191	349067	365281	380879	395904	410395	424386	437908	49
50	0.332478	0.349343	0.365546	0.381134	0.396150	0.410632	0.424615	0.438129	50
51	332764	349618	365810	381389	396395	410869	424844	438351	51
52	333051	349893	366075	381643	396641	411106	425073	438572	52
53	333337	350168	366339	381898	396886	411343	425301	438793	53
54	333624	350443	366604	382152	397132	411579	425530	439014	54
55	0.333910	0.350718	0.366868	0.382406	0.397377	0.411816	0.425758	0.439235	55
56	334195	350992	367131	382661	397621	412052	425987	439456	56
57	334481	351266	367395	382914	397866	412288	426215	439677	57
58	334766	351540	367659	383168	398111	412524	426443	439897	58
59	335052	351814	367922	383422	398355	412760	426671	440118	59

TABLE XXIII.

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE. 32°	33°	34°	35°	36°	37°	38°	39°	M.
0	0.440338	0.453342	0.465935	0.478142	0.489982	0.501476	0.512642	0.523495	0
1	440558	453555	466142	478342	490177	501665	512825	523674	1
2	440778	453768	466348	478542	490371	501854	513009	523852	2
3	440998	453981	466555	478742	490565	502042	513192	524030	3
4	441218	454194	466761	478942	490759	502231	513375	524208	4
5	0.441438	0.454407	0.466967	0.479142	0.490953	0.502419	0.513558	0.524386	5
6	441658	454619	467173	479342	491147	502607	513741	524564	6
7	441877	454832	467379	479542	491341	502796	513924	524742	7
8	442096	455044	467585	479741	491535	502984	514107	524920	8
9	442316	455256	467790	479941	491728	503172	514289	525097	9
10	0.442535	0.455469	0.467996	0.480140	0.491922	0.503360	0.514472	0.525275	10
11	442754	455681	468201	480339	492115	503547	514655	525452	11
12	442973	455893	468407	480538	492308	503735	514837	525630	12
13	443192	456104	468612	480738	492501	503923	515019	525807	13
14	443410	456316	468817	480937	492695	504110	515202	525984	14
15	0.443629	0.456528	0.469022	0.481135	0.492888	0.504298	0.515384	0.526162	15
16	443847	456739	469227	481334	493081	504485	515566	526339	16
17	444065	456951	469432	481533	493273	504673	515748	526516	17
18	444284	457162	469637	481731	493466	504860	515930	526693	18
19	444502	457373	469842	481930	493659	505047	516112	526870	19
20	0.444720	0.457584	0.470046	0.482128	0.493851	0.505234	0.516294	0.527046	20
21	444938	457795	470250	482327	494044	505421	516475	527223	21
22	445155	458006	470455	482525	494236	505608	516657	527400	22
23	445373	458216	470659	482723	494428	505794	516838	527576	23
24	445590	458427	470863	482921	494621	505981	517020	527753	24
25	0.445808	0.458638	0.471067	0.483119	0.494813	0.506168	0.517201	0.527929	25
26	446025	458848	471271	483316	495005	506354	517382	528105	26
27	446242	459058	471475	483514	495196	506541	517564	528281	27
28	446459	459268	471678	483712	495388	506727	517745	528458	28
29	446676	459478	471882	483909	495580	506913	517926	528634	29
30	0.446893	0.459688	0.472086	0.484107	0.495772	0.507099	0.518107	0.528810	30
31	447109	459898	472289	484304	495963	507285	518287	528986	31
32	447326	460108	472492	484501	496154	507471	518468	529161	32
33	447542	460317	472695	484698	496346	507657	518649	529337	33
34	447759	460527	472898	484895	496537	507843	518829	529513	34
35	0.447975	0.460736	0.473101	0.485092	0.496728	0.508028	0.519010	0.529688	35
36	448191	460946	473304	485289	496919	508214	519190	529864	36
37	448407	461155	473507	485485	497110	508400	519371	530039	37
38	448623	461364	473710	485682	497301	508585	519551	530215	38
39	448838	461573	473912	485878	497492	508770	519731	530390	39
40	0.449054	0.461782	0.474115	0.486075	0.497682	0.508956	0.519911	0.530565	40
41	449269	461990	474317	486271	497873	509141	520091	530740	41
42	449485	462199	474519	486467	498063	509326	520271	530915	42
43	449700	462407	474721	486663	498254	509511	520451	531090	43
44	449915	462616	474923	486860	498444	509696	520631	531265	44
45	0.450130	0.462824	0.475125	0.487055	0.498634	0.509880	0.520810	0.531440	45
46	450345	463032	475327	487251	498824	510065	520990	531614	46
47	450560	463240	475529	487447	499014	510250	521169	531789	47
48	450775	463448	475730	487643	499204	510434	521349	531963	48
49	450989	463656	475932	487838	499394	510619	521528	532138	49
50	0.451204	0.463864	0.476133	0.488033	0.499584	0.510803	0.521707	0.532312	50
51	451418	464071	476335	488229	499774	510987	521886	532487	51
52	451632	464279	476536	488424	499963	511172	522066	532661	52
53	451846	464486	476737	488619	500153	511356	522245	532835	53
54	452060	464694	476938	488814	500342	511540	522424	533009	54
55	0.452274	0.464901	0.477139	0.489009	0.500531	0.511724	0.522602	0.533183	55
56	452488	465108	477340	489204	500721	511907	522781	533357	56
57	452702	465315	477540	489399	500910	512091	522960	533531	57
58	452915	465522	477741	489593	501099	512275	523138	533704	58
59	453128	465729	477941	489788	501288	512458	523317	533878	59

TABLE XXIII.

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE.								M.
	40°	41°	42°	43°	44°	45°	46°	47°	
0	0.534052	0.544325	0.554329	0.564075	0.573575	0.582840	0.591878	0.600700	0
1	534225	544494	554494	564236	573732	582992	592027	600845	1
2	534399	544663	554658	564396	573888	583145	592175	600990	2
3	534572	544832	554822	564556	574044	583297	592324	601135	3
4	534745	545000	554987	564716	574200	583449	592473	601280	4
5	0.534918	0.545169	0.555151	0.564876	0.574356	0.583601	0.592621	0.601426	5
6	535092	545338	555315	565036	574512	583754	592770	601570	6
7	535265	545506	555479	565196	574668	583906	592918	601715	7
8	535438	545674	555643	565356	574824	584058	593067	601860	8
9	535610	545843	555807	565516	574980	584210	593215	602005	9
10	0.535783	0.546011	0.555971	0.565676	0.575136	0.584361	0.593363	0.602150	10
11	535956	546179	556135	565835	575291	584513	593511	602294	11
12	536129	546347	556299	565995	575447	584665	593659	602439	12
13	536301	546515	556462	566154	575602	584817	593807	602583	13
14	536474	546683	556626	566314	575758	584968	593955	602728	14
15	0.536646	0.546851	0.556789	0.566473	0.575913	0.585120	0.594103	0.602872	15
16	536818	547019	556953	566632	576069	585272	594251	603017	16
17	536991	547187	557116	566792	576224	585423	594399	603161	17
18	537163	547354	557280	566951	576379	585574	594547	603305	18
19	537335	547522	557443	567110	576534	585726	594695	603449	19
20	0.537507	0.547689	0.557606	0.567269	0.576689	0.585877	0.594842	0.603594	20
21	537679	547857	557769	567428	576844	586028	594990	603738	21
22	537851	548024	557932	567587	576999	586179	595137	603882	22
23	538023	548191	558095	567746	577154	586330	595285	604026	23
24	538194	548359	558258	567904	577309	586481	595432	604170	24
25	0.538366	0.548526	0.558421	0.568063	0.577464	0.586632	0.595579	0.604313	25
26	538538	548693	558583	568222	577618	586783	595727	604457	26
27	538709	548860	558746	568380	577773	586934	595874	604601	27
28	538880	549027	558909	568539	577927	587085	596021	604745	28
29	539052	549193	559071	568697	578082	587236	596168	604888	29
30	0.539223	0.549360	0.559234	0.568855	0.578236	0.587386	0.596315	0.605032	30
31	539394	549527	559396	569014	578391	587537	596462	605175	31
32	539565	549693	559558	569172	578545	587688	596609	605319	32
33	539736	549860	559721	569330	578699	587838	596756	605462	33
34	539907	550027	559883	569488	578853	587988	596903	605606	34
35	0.540078	0.550193	0.560045	0.569646	0.579008	0.588139	0.597050	0.605749	35
36	540249	550359	560207	569804	579162	588289	597196	605892	36
37	540420	550525	560369	569962	579316	588439	597343	606035	37
38	540590	550692	560531	570120	579469	588590	597490	606179	38
39	540761	550858	560693	570278	579623	588740	597636	606322	39
40	0.540931	0.551024	0.560855	0.570435	0.579777	0.588890	0.597783	0.606465	40
41	541102	551190	561016	570593	579931	589040	597929	606608	41
42	541272	551356	561178	570751	580085	589190	598075	606751	42
43	541442	551521	561339	570908	580238	589339	598222	606893	43
44	541613	551687	561501	571066	580392	589489	598368	607036	44
45	0.541783	0.551853	0.561662	0.571223	0.580545	0.589639	0.598514	0.607179	45
46	541953	552018	561824	571380	580699	589789	598660	607322	46
47	542123	552184	561985	571537	580852	589938	598806	607464	47
48	542293	552349	562146	571695	581005	590088	598952	607607	48
49	522462	552515	562307	571852	581158	590237	599098	607749	49
50	0.542632	0.552680	0.562468	0.572009	0.581312	0.590387	0.599244	0.607892	50
51	542802	552845	562629	572166	581465	590536	599390	608034	51
52	542971	553010	562790	572323	581618	590686	599536	608177	52
53	543141	553175	562951	572479	581771	590835	599681	608319	53
54	543310	553341	563112	572636	581924	590984	599827	608461	54
55	0.543480	0.553505	0.563273	0.572793	0.582076	0.591133	0.599973	0.608603	55
56	543649	553670	563433	572950	582229	591282	600118	608745	56
57	543818	553835	563594	573106	582382	591431	600264	608887	57
58	543987	554000	563755	573263	582535	591580	600409	609029	58
59	544156	554165	563915	573419	582687	591729	600554	609171	59

TABLE XXIII.

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE. 48°	49°	50°	51°	52°	53°	54°	55°	M.
0	0.609313	0.617727	0.625948	0.633984	0.641842	0.649527	0.657047	0.664406	0
1	609455	617865	626084	634117	641971	649654	657171	664527	1
2	609597	618004	626219	634249	642101	649781	657295	664648	2
3	609739	618142	626354	634381	642230	649907	657418	664769	3
4	609880	618281	626490	634514	642360	650034	657542	664891	4
5	0.610022	0.618419	0.626625	0.634646	0.642489	0.650160	0.657666	0.665012	5
6	610163	618558	626760	634778	642618	650287	657790	665133	6
7	610305	618696	626895	634910	642747	650413	657913	665254	7
8	610447	618834	627030	635042	642876	650539	658037	665375	8
9	610588	618972	627165	635174	643006	650666	658161	665496	9
10	0.610729	0.619110	0.627300	0.635306	0.643135	0.650792	0.658284	0.665617	10
11	610870	619248	627435	635438	643264	650918	658408	665738	11
12	611012	619386	627570	635570	643393	651044	658531	665859	12
13	611153	619524	627705	635702	643521	651170	658655	665979	13
14	611294	619662	627840	635833	643650	651297	658778	666100	14
15	0.611435	0.619800	0.627974	0.635965	0.643779	0.651423	0.658901	0.666221	15
16	611576	619938	628109	636097	643908	651549	659025	666342	16
17	611717	620075	628244	636228	644037	651674	659148	666462	17
18	611858	620213	628378	636360	644165	651800	659271	666583	18
19	611999	620351	628513	636492	644294	651926	659394	666703	19
20	0.612140	0.620488	0.628647	0.636623	0.644423	0.652052	0.659517	0.666824	20
21	612280	620626	628782	636754	644551	652178	659640	666944	21
22	612421	620763	628916	636886	644680	652304	659763	667065	22
23	612562	620901	629050	637017	644808	652429	659886	667185	23
24	612702	621038	629185	637148	644936	652555	660009	667305	24
25	0.612843	0.621175	0.629319	0.637280	0.645065	0.652680	0.660132	0.667426	25
26	612983	621313	629453	637411	645193	652806	660255	667546	26
27	613124	621450	629587	637542	645321	652931	660378	667666	27
28	613264	621587	629721	637673	645450	653057	660500	667786	28
29	613404	621724	629855	637804	645578	653182	660623	667906	29
30	0.613545	0.621861	0.629989	0.637935	0.645706	0.653307	0.660746	0.668026	30
31	613685	621998	630123	638066	645834	653433	660868	668147	31
32	613825	622135	630257	638197	645962	653558	660991	668267	32
33	613965	622272	630391	638328	646090	653683	661114	668386	33
34	614105	622409	630524	638458	646218	653808	661236	668506	34
35	0.614245	0.622546	0.630658	0.638589	0.646346	0.653933	0.661359	0.668626	35
36	614385	622682	630792	638720	646474	654059	661481	668746	36
37	614525	622819	630925	638851	646601	654184	661603	668866	37
38	614665	622956	631059	638981	646729	654309	661726	668986	38
39	614804	623092	631192	639112	646857	654433	661848	669105	39
40	0.614944	0.623229	0.631326	0.639242	0.646984	0.654558	0.661970	0.669225	40
41	615084	623365	631459	639373	647112	654683	662092	669345	41
42	615223	623502	631593	639503	647239	654808	662214	669464	42
43	615363	623638	631726	639633	647367	654933	662337	669584	43
44	615502	623774	631859	639764	647494	655058	662459	669703	44
45	0.615642	0.623911	0.631992	0.639894	0.647622	0.655182	0.662581	0.669823	45
46	615781	624047	632125	640024	647749	655307	662703	669942	46
47	615921	624183	632259	640154	647877	655431	662824	670061	47
48	616060	624319	632392	640284	648004	655556	662946	670181	48
49	616199	624455	632525	640414	648131	655680	663068	670300	49
50	0.616338	0.624591	0.632658	0.640544	0.648258	0.655806	0.663190	0.670419	50
51	616477	624727	632790	640674	648385	655929	663312	670538	51
52	616616	624863	632923	640804	648512	656054	663433	670658	52
53	616755	624999	633056	640934	648639	656178	663555	670777	53
54	616894	625135	633189	641064	648766	656302	663677	670896	54
55	0.617033	0.625270	0.633322	0.641194	0.648893	0.656426	0.663798	0.671015	55
56	617172	625406	633454	641323	649020	656551	663920	671134	56
57	617311	625542	633587	641453	649147	656675	664041	671253	57
58	617450	625677	633719	641583	649274	656799	664163	671372	58
59	617588	625813	633852	641712	649401	656923	664284	671490	59

TABLE XXIII.

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE.								M.
	56°	57°	58°	59°	60°	61°	62°	63°	
0	0.671809	0.678663	0.685571	0.692339	0.698970	0.705469	0.711839	0.718085	0
1	671728	678779	685685	692450	699079	705576	711944	718188	1
2	671847	678895	685799	692562	699189	705683	712049	718291	2
3	671965	679012	685913	692674	699298	705790	712155	718394	3
4	672084	679128	686027	692785	699407	705897	712260	718497	4
5	0.672203	0.679244	0.686140	0.692897	0.699517	0.706005	0.712364	0.718600	5
6	672321	679360	686254	693008	699626	706112	712469	718703	6
7	672440	679476	686368	693119	699735	706219	712574	718806	7
8	672558	679592	686482	693231	699844	706326	712679	718909	8
9	672677	679708	686595	693342	699953	706432	712784	719011	9
10	0.672795	0.679824	0.686709	0.693453	0.700062	0.706539	0.712889	0.719114	10
11	672913	679940	686822	693565	700171	706646	712994	719217	11
12	673032	680056	686936	693676	700280	706753	713098	719320	12
13	673150	680172	687049	693787	700389	706860	713203	719422	13
14	673268	680288	687163	693898	700498	706967	713308	719525	14
15	0.673387	0.680403	0.687276	0.694009	0.700607	0.707073	0.713412	0.719627	15
16	673505	680519	687389	694120	700716	707180	713517	719730	16
17	673623	680635	687503	694231	700825	707287	713621	719833	17
18	673741	680750	687616	694342	700933	707393	713726	719935	18
19	673859	680866	687729	694453	701042	707500	713830	720037	19
20	0.673977	0.680982	0.687842	0.694564	0.701151	0.707606	0.713935	0.720140	20
21	674095	681097	687956	694675	701259	707713	714039	720242	21
22	674213	681213	688069	694786	701368	707819	714144	720345	22
23	674331	681328	688182	694897	701477	707926	714248	720447	23
24	674448	681443	688295	695007	701585	708032	714352	720549	24
25	0.674566	0.681559	0.688408	0.695118	0.701694	0.708139	0.714457	0.720651	25
26	674684	681674	688521	695229	701802	708245	714561	720754	26
27	674802	681789	688634	695339	701911	708351	714665	720856	27
28	674919	681905	688747	695450	702019	708458	714769	720958	28
29	675037	682020	688859	695561	702127	708564	714873	721060	29
30	0.675155	0.682135	0.688972	0.695671	0.702236	0.708670	0.714978	0.721162	30
31	675272	682250	689085	695782	702344	708776	715082	721264	31
32	675390	682365	689198	695892	702452	708882	715186	721366	32
33	675507	682480	689311	696003	702560	708988	715290	721468	33
34	675624	682595	689423	696113	702669	709094	715394	721570	34
35	0.675742	0.682710	0.689536	0.696223	0.702777	0.709200	0.715498	0.721672	35
36	675859	682825	689648	696334	702885	709306	715601	721774	36
37	675976	682940	689761	696444	702993	709412	715705	721876	37
38	676094	683055	689873	696554	703101	709518	715809	721978	38
39	676211	683170	689986	696664	703209	709624	715913	722080	39
40	0.676328	0.683284	0.690098	0.696775	0.703317	0.709730	0.716017	0.722181	40
41	676445	683399	690211	696885	703425	709836	716120	722283	41
42	676562	683514	690323	696995	703533	709941	716224	722385	42
43	676679	683628	690435	697105	703641	710047	716328	722486	43
44	676796	683743	690548	697215	703749	710153	716432	722588	44
45	0.676913	0.683857	0.690660	0.697325	0.703856	0.710259	0.716535	0.722690	45
46	677030	683972	690772	697435	703964	710364	716639	722791	46
47	677147	684086	690884	697545	704072	710470	716742	722893	47
48	677264	684201	690996	697654	704179	710575	716846	722994	48
49	677381	684315	691108	697764	704287	710681	716949	723096	49
50	0.677497	0.684430	0.691220	0.697874	0.704395	0.710786	0.717053	0.723197	50
51	677614	684544	691332	697984	704502	710892	717156	723299	51
52	677731	684658	691444	698094	704610	710997	717259	723400	52
53	677848	684773	691556	698203	704717	711103	717363	723501	53
54	677964	684887	691668	698313	704825	711208	717466	723603	54
55	0.678081	0.685001	0.691780	0.698422	0.704932	0.711313	0.717569	0.723704	55
56	678197	685115	691892	698532	705040	711419	717673	723805	56
57	678314	685229	692004	698642	705147	711524	717776	723906	57
58	678430	685343	692115	698751	705254	711629	717879	724007	58
59	678546	685457	692227	698861	705362	711734	717982	724109	59

TABLE XXIII.

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE. 64°	65°	66°	67°	68°	69°	70°	71°	M.
0	0.724210	0.730216	0.736109	0.741889	0.747562	0.753126	0.758591	0.763954	0
1	724311	730316	736206	741985	747655	753220	758681	764043	1
2	724412	730415	736303	742080	747749	753312	758772	764131	2
3	724513	730514	736400	742176	747842	753404	758862	764220	3
4	724614	730613	736498	742271	747936	753495	758952	764308	4
5	0.724715	0.730712	0.736595	0.742366	0.748029	0.753587	0.759042	0.764396	5
6	724816	730811	736692	742462	748123	753679	759132	764485	6
7	724916	730910	736789	742557	748216	753771	759222	764573	7
8	725017	731009	736886	742652	748310	753862	759312	761662	8
9	725118	731108	736983	742747	748403	753954	759402	764750	9
10	0.725219	0.731206	0.737080	0.742842	0.748497	0.754046	0.759492	0.764838	10
11	725320	731305	737177	742937	748590	754137	759582	764926	11
12	725420	731404	737274	743033	748683	754229	759672	765015	12
13	725521	731503	737371	743128	748777	754320	759762	765103	13
14	725622	731602	737467	743223	748870	754412	759851	765191	14
15	0.725722	0.731700	0.737564	0.743318	0.748963	0.754503	0.759941	0.765279	15
16	725823	731799	737661	743413	749056	754595	760031	765367	16
17	725923	731897	737758	743507	749149	754686	760121	765455	17
18	726024	731996	737855	743602	749242	754778	760211	765544	18
19	726124	732095	737951	743697	749336	754869	760300	765632	19
20	0.726225	0.732193	0.738048	0.743792	0.749429	0.754960	0.760390	0.765720	20
21	726325	732292	738145	743887	749522	755052	760480	765808	21
22	726426	732390	738241	743982	749615	755143	760569	765896	22
23	726526	732489	738338	744076	749708	755234	760659	765984	23
24	726626	732587	738434	744171	749801	755326	760748	766072	24
25	0.726727	0.732685	0.738531	0.744266	0.749894	0.755417	0.760838	0.766159	25
26	726827	732784	738627	744361	749987	755508	760927	766247	26
27	726927	732882	738724	744455	750079	755599	761017	766335	27
28	727027	732980	738820	744550	750172	755690	761106	766423	28
29	727127	733079	738916	744644	750265	755781	761196	766511	29
30	0.727228	0.733177	0.739013	0.744739	0.750358	0.755872	0.761285	0.766598	30
31	727328	733275	739109	744833	750451	755963	761374	766686	31
32	727428	733373	739205	744928	750543	756054	761464	766774	32
33	727528	733471	739302	745022	750636	756145	761553	766862	33
34	727628	733569	739398	745116	750729	756236	761642	766949	34
35	0.727728	0.733667	0.739494	0.745211	0.750821	0.756327	0.761732	0.767037	35
36	727828	733765	739590	745306	750914	756418	761821	767124	36
37	727928	733863	739686	745400	751007	756509	761910	767212	37
38	728027	733961	739783	745494	751099	756600	761999	767300	38
39	728127	734059	739879	745589	751192	756691	762088	767387	39
40	0.728227	0.734157	0.739975	0.745683	0.751284	0.756782	0.762177	0.767475	40
41	728327	734255	740071	745777	751377	756872	762267	767562	41
42	728127	734353	740167	745871	751469	756963	762356	767649	42
43	728526	734451	740263	745965	751561	757054	762445	767737	43
44	728626	734548	740359	746059	751654	757144	762534	767824	44
45	0.728726	0.734646	0.740455	0.746154	0.751746	0.757235	0.762623	0.767912	45
46	728825	734744	740550	746248	751839	757326	762712	767999	46
47	728925	734842	740646	746342	751931	757416	762800	768086	47
48	729024	734939	740742	746436	752023	757507	762889	768173	48
49	729124	735037	740838	746530	752115	757597	762978	768261	49
50	0.729223	0.735135	0.740934	0.746624	0.752208	0.757688	0.763067	0.768348	50
51	729323	735232	741029	746718	752300	757778	763156	768435	51
52	729422	735330	741125	746812	752392	757869	763245	768522	52
53	729522	735427	741221	746905	752484	757959	763333	768609	53
54	729621	735525	741316	746999	752576	758050	763422	768697	54
55	0.729720	0.735622	0.741412	0.747093	0.752668	0.758140	0.763511	0.768784	55
56	729820	735719	741508	747187	752760	758230	763600	768871	56
57	729919	735817	741603	747281	752852	758320	763688	768958	57
58	730018	735914	741699	747374	752944	758411	763777	769045	58
59	730117	736011	741794	747468	753036	758501	763865	769132	59

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE. 72°	73°	74°	75°	76°	77°	78°	79°	M.
0	0.769219	0.774388	0.779463	0.784447	0.789342	0.794150	0.798872	0.803510	0
1	769306	774473	779547	784529	789423	794229	798950	803587	1
2	769393	774558	779631	784612	789504	794308	799028	803664	2
3	769479	774644	779714	784694	789584	794388	799106	803740	3
4	769566	774729	779798	784776	789665	794467	799184	803817	4
5	0.769653	0.774814	0.779882	0.784858	0.789746	0.794546	0.799261	0.803893	5
6	769740	774899	779966	784941	789827	794626	799339	803970	6
7	769827	774984	780049	785023	789907	794705	799417	804046	7
8	769913	775070	780133	785105	789988	794784	799495	804123	8
9	770000	775155	780216	785187	790069	794863	799573	804199	9
10	0.770087	0.775240	0.780300	0.785269	0.790149	0.794942	0.799651	0.804276	10
11	770173	775325	780384	785351	790230	795022	799728	804352	11
12	770260	775410	780467	785433	790310	795101	799806	804428	12
13	770347	775495	780551	785515	790391	795180	799884	804505	13
14	770433	775580	780634	785597	790471	795259	799962	804581	14
15	0.770520	0.775665	0.780717	0.785679	0.790552	0.795338	0.800039	0.804657	15
16	770606	775750	780801	785761	790632	795417	800117	804734	16
17	770693	775835	780884	785843	790713	795496	800194	804810	17
18	770779	775920	780968	785925	790793	795575	800272	804886	18
19	770866	776005	781051	786007	790874	795654	800350	804962	19
20	0.770952	0.776090	0.781134	0.786089	0.790954	0.795733	0.800427	0.805039	20
21	771039	776174	781218	786170	791034	795812	800505	805115	21
22	771125	776259	781301	786252	791115	795891	800582	805191	22
23	771211	776344	781384	786334	791195	795970	800660	805267	23
24	771298	776429	781468	786416	791275	796049	800737	805343	24
25	0.771384	0.776514	0.781551	0.786497	0.791356	0.796127	0.800815	0.805419	25
26	771470	776598	781634	786579	791436	796206	800892	805495	26
27	771556	776683	781717	786661	791516	796285	800969	805571	27
28	771643	776768	781800	786742	791596	796364	801047	805647	28
29	771729	776852	781883	786824	791676	796442	801124	805723	29
30	0.771815	0.776937	0.781966	0.786906	0.791757	0.796521	0.801201	0.805799	30
31	771901	777021	782049	786987	791837	796600	801279	805875	31
32	771987	777106	782132	787069	791917	796679	801356	805951	32
33	772073	777190	782215	787150	791997	796757	801433	806027	33
34	772159	777275	782298	787232	792077	796836	801511	806103	34
35	0.772245	0.777359	0.782381	0.787313	0.792157	0.796914	0.801588	0.806179	35
36	772331	777444	782464	787395	792237	796993	801665	806254	36
37	772417	777528	782547	787476	792317	797072	801742	806330	37
38	772503	777613	782630	787557	792397	797150	801819	806406	38
39	772589	777697	782713	787639	792477	797229	801896	806482	39
40	0.772675	0.777781	0.782796	0.787720	0.792557	0.797307	0.801973	0.806557	40
41	772761	777866	782879	787801	792636	797386	802050	806633	41
42	772847	777950	782961	787883	792716	797464	802128	806709	42
43	772933	778034	783044	787964	792796	797542	802205	806785	43
44	773018	778119	783127	788045	792876	797621	802282	806860	44
45	0.773104	0.778203	0.783209	0.788126	0.792956	0.797699	0.802359	0.806936	45
46	773190	778287	783292	788208	793035	797777	802436	807011	46
47	773276	778371	783375	788289	793115	797856	802512	807087	47
48	773361	778455	783457	788370	793195	797934	802589	807163	48
49	773447	778539	783540	788451	793275	798012	802666	807238	49
50	0.773533	0.778623	0.783623	0.788532	0.793354	0.798091	0.802743	0.807314	50
51	773618	778708	783705	788613	793434	798169	802820	807389	51
52	773704	778792	783788	788694	793514	798247	802897	807465	52
53	773789	778876	783870	788775	793593	798325	802974	807540	53
54	773875	778960	783953	788856	793673	798403	803050	807615	54
55	0.773960	0.779044	0.784035	0.788937	0.793752	0.798481	0.803127	0.807691	55
56	774046	779128	784118	789018	793832	798560	803204	807766	56
57	774131	779211	784200	789099	793911	798638	803280	807842	57
58	774217	779295	784282	789180	793991	798716	803357	807917	58
59	774302	779379	784365	789261	794070	798794	803434	807992	59

TABLE XXIII.

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE. 80°	81°	82°	83°	84°	85°	86°	87°	M.
0	0.808067	0.812544	0.816943	0.821265	0.825511	0.829683	0.833783	0.837812	0
1	808143	812618	817016	821336	825581	829752	833851	837879	1
2	808218	812692	817088	821407	825651	829821	833919	837945	2
3	808293	812766	817160	821479	825721	829890	833986	838012	3
4	808368	812840	817233	821550	825791	829959	834054	838078	4
5	0.808444	0.812914	0.817306	0.821621	0.825861	0.830028	0.834122	0.838145	5
6	808519	812988	817379	821693	825931	830097	834189	838211	6
7	808594	813062	817451	821764	826001	830165	834257	838278	7
8	808669	813135	817524	821835	826071	830234	834325	838344	8
9	808744	813209	817596	821906	826141	830303	834392	838410	9
10	0.808819	0.813283	0.817668	0.821977	0.826211	0.830372	0.834460	0.838477	10
11	808894	813357	817741	822049	826281	830440	834527	838543	11
12	808969	813430	817813	822120	826351	830509	834595	838610	12
13	809044	813504	817886	822191	826421	830578	834662	838676	13
14	809119	813578	817958	822262	826491	830646	834730	838742	14
15	0.809194	0.813651	0.818030	0.822333	0.826561	0.830715	0.834797	0.838808	15
16	809269	813725	818103	822404	826631	830784	834865	838875	16
17	809344	813799	818175	822475	826700	830852	834932	838941	17
18	809419	813872	818247	822546	826770	830921	834999	839007	18
19	809494	813946	818320	822617	826840	830989	835067	839073	19
20	0.809569	0.814019	0.818392	0.822688	0.826910	831058	0.835134	0.839140	20
21	809643	814093	818464	822759	826980	831126	835201	839206	21
22	809718	814166	818536	822830	827049	831195	835269	839272	22
23	809793	814240	818609	822901	827119	831263	835336	839338	23
24	809868	814313	818681	822972	827189	831332	835403	839404	24
25	0.809942	0.814387	0.818753	0.823043	0.827258	0.831400	0.835471	0.839470	25
26	810017	814460	818825	823114	827328	831469	835538	839536	26
27	810092	814533	818897	823185	827398	831537	835605	839602	27
28	810167	814607	818969	823255	827467	831606	835672	839668	28
29	810241	814680	819041	823326	827537	831674	835739	839734	29
30	0.810316	0.814753	0.819113	0.823397	0.827606	0.831742	0.835807	0.839800	30
31	810390	814827	819185	823468	827676	831811	835874	839866	31
32	810465	814900	819257	823539	827745	831879	835941	839932	32
33	810540	814973	819329	823609	827815	831947	836008	839998	33
34	810614	815046	819401	823680	827884	832015	836075	840064	34
35	0.810689	0.815120	0.819473	0.823751	0.827954	0.832084	0.836142	0.840130	35
36	810763	815193	819545	823821	828023	832152	836209	840196	36
37	810838	815266	819617	823892	828092	832220	836276	840262	37
38	810912	815339	819689	823963	828162	832288	836343	840328	38
39	810986	815412	819761	824033	828231	832356	836410	840393	39
40	0.811061	0.815485	0.819832	0.824104	0.828301	0.832425	0.836477	0.840459	40
41	811135	815558	819904	824174	828370	832493	836544	840525	41
42	811210	815632	819976	824245	828439	832561	836611	840591	42
43	811284	815704	820048	824315	828509	832629	836678	840656	43
44	811358	815778	820120	824386	828578	832697	836745	840722	44
45	0.811433	0.815851	0.820191	0.824456	0.828647	0.832765	0.836812	0.840788	45
46	811507	815924	820263	824527	828716	832833	836878	840854	46
47	811581	815996	820335	824597	828785	832901	836945	840919	47
48	811655	816069	820406	824668	828855	832969	837012	840985	48
49	811730	816142	820478	824738	828924	833037	837079	841051	49
50	0.811804	0.816215	0.820550	0.824808	0.828993	0.833105	0.837146	0.841116	50
51	811878	816288	820621	824879	829062	833173	837212	841182	51
52	811952	816361	820693	824949	829131	833241	837279	841247	52
53	812026	816434	820764	825019	829200	833309	837346	841313	53
54	812100	816507	820836	825090	829269	833377	837412	841378	54
55	0.812174	0.816579	0.820907	0.825160	0.829338	0.833444	0.837479	0.841444	55
56	812248	816652	820979	825230	829407	833512	837546	841509	56
57	812322	816725	821050	825300	829476	833580	837612	841575	57
58	812396	816798	821122	825371	829545	833648	837679	841640	58
59	812470	816870	821193	825441	829614	833716	837746	841706	59

TABLE XXIII.

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE. 88°	89°	90°	91°	92°	93°	94°	95°	M.
0	0.841771	0.845662	0.849485	0.853242	0.856934	0.860562	0.864127	0.867631	0
1	841837	845726	849548	853301	856995	860622	864186	867689	1
2	841902	845790	849611	853366	857056	860682	864245	867747	2
3	841967	845854	849674	853428	857117	860742	864304	867804	3
4	842033	845919	849738	853490	857178	860802	864363	867862	4
5	0.842098	0.845983	0.849801	0.853552	0.857239	0.860862	0.864422	0.867920	5
6	842163	846047	849864	853614	857300	860922	864481	867978	6
7	842229	846111	849927	853676	857361	860981	864539	868036	7
8	842294	846175	849990	853738	857422	861041	864598	868093	8
9	842359	846239	850053	853800	857482	861101	864657	868151	9
10	0.842424	0.846304	0.850116	0.853862	0.857543	0.861161	0.864716	0.868209	10
11	842490	846368	850179	853924	857604	861220	864774	868266	11
12	842555	846432	850242	853986	857665	861280	864833	868324	12
13	842620	846496	850305	854047	857726	861340	864892	868382	13
14	842685	846560	850368	854109	857786	861400	864950	868440	14
15	0.842750	0.846624	0.850430	0.854171	0.857847	0.861459	0.865009	0.868497	15
16	842815	846688	850493	854233	857908	861519	865068	868555	16
17	842880	846752	850556	854295	857968	861579	865126	868612	17
18	842946	846816	850619	854356	858029	861638	865185	868670	18
19	843011	846880	850682	854418	858090	861698	865243	868728	19
20	0.843076	0.846944	0.850745	0.854480	0.858151	0.861758	0.865302	0.868785	20
21	843141	847007	850807	854542	858211	861817	865361	868843	21
22	843206	847071	850870	854603	858272	861877	865419	868900	22
23	843271	847135	850933	854665	858332	861936	865478	868958	23
24	843336	847199	850996	854727	858393	861996	865536	869015	24
25	0.843401	0.847263	0.851058	0.854788	0.858453	0.862055	0.865595	0.869073	25
26	843466	847327	851121	854850	858514	862115	865653	869130	26
27	843530	847390	851184	854911	858575	862174	865712	869187	27
28	843595	847454	851246	854973	858635	862234	865770	869245	28
29	843660	847518	851309	855035	858696	862293	865828	869302	29
30	0.843725	0 847582	0.851372	0.855096	0.858756	0.862353	0.865887	0.869360	30
31	843790	847645	851434	855158	858816	862412	865945	869417	31
32	843855	847709	851497	855219	858877	862471	866004	869474	32
33	843919	847773	851559	855281	858937	862531	866062	869532	33
34	843984	847836	851622	855342	858998	862590	866120	869589	34
35	0.844049	0.847900	0.851685	0.855404	0.859058	0.862649	0.866179	0.869646	35
36	844114	847964	851747	855465	859119	862709	866237	869704	36
37	844178	848027	851810	855526	859179	862768	866295	869761	37
38	844243	848091	851872	855588	859239	862827	866353	869818	38
39	844308	848154	851934	855649	859300	862887	866412	869875	39
40	0.844372	0.848218	0.851997	0.855711	0.859360	0.862946	0.866470	0.869933	40
41	844437	848281	852059	855772	859420	863005	866528	869990	41
42	844502	848345	852122	855833	859480	863064	866586	870047	42
43	844566	848408	852184	855894	859541	863124	866644	870104	43
44	844631	848472	852247	855956	859601	863183	866703	870161	44
45	0.844695	0.848535	0.852309	0.856017	0.859661	0.863242	0.866761	0.870218	45
46	844760	848599	852371	856078	859721	863301	866819	870276	46
47	844825	848662	852434	856140	859781	863360	866877	870333	47
48	844889	848726	852496	856201	859842	863419	866935	870390	48
49	844954	848789	852558	856262	859902	863478	866993	870447	49
50	0.845018	0.848852	0.852620	0.856323	0.859962	0.863538	0.867051	0.870504	50
51	845082	848916	852683	856384	860022	863597	867109	870561	51
52	845147	848979	852745	856446	860082	863656	867167	870618	52
53	845211	849042	852807	856507	860142	863715	867225	870675	53
54	845276	849106	852869	856568	860202	863774	867283	870732	54
55	0.845340	0.849169	0.852931	0.856629	0.860262	0.863833	0.867341	0.870789	55
56	845405	849232	852994	856690	860322	863892	867399	870846	56
57	845469	849295	853056	856751	860382	863951	867457	870903	57
58	845533	849359	853118	856812	860442	864010	867515	870960	58
59	845597	849422	853180	856873	860502	864069	867573	871017	59

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE.								M.
	96°	97°	98°	99°	100°	101°	102°	103°	
0	0.871073	0.874456	0.877780	0.881045	0.884254	0.887406	0.890503	0.893544	0
1	871130	874512	877835	881099	884307	887458	890554	893595	1
2	871187	874568	877890	881153	884360	887510	890605	893645	2
3	871244	874624	877944	881207	884413	887562	890656	893695	3
4	871301	874680	877999	881261	884466	887614	890707	893745	4
5	0.871358	0.874735	0.878054	0.881315	0.884519	0.887666	0.890758	0.893795	5
6	871414	874791	878109	881369	884572	887718	890809	893846	6
7	871471	874847	878164	881423	884625	887770	890860	893896	7
8	871528	874903	878219	881477	884677	887822	890911	893946	8
9	871585	874958	878273	881530	884730	887874	890962	893996	9
10	0.871641	0.875014	0.878328	0.881584	0.884783	0.887926	0.891013	0.894046	10
11	871698	875070	878383	881638	884836	887978	891064	894096	11
12	871755	875126	878438	881692	884889	888030	891115	894146	12
13	871811	875181	878492	881745	884942	888082	891166	894196	13
14	871868	875237	878547	881799	884994	888133	891217	894246	14
15	0.871925	0.875293	0.878602	0.881853	0.885047	0.888185	0.891268	0.894296	15
16	871981	875348	878656	881907	885100	888237	891319	894346	16
17	872038	875404	878711	881960	885153	888289	891370	894396	17
18	872095	875459	878766	882014	885205	888341	891421	894446	18
19	872151	875515	878820	882068	885258	888393	891472	894496	19
20	0.872208	0.875571	0.878875	0.882121	0.885311	0.888444	0.891523	0.894546	20
21	872264	875626	878929	882175	885364	888496	891573	894596	21
22	872321	875682	878984	882229	885416	888548	891624	894646	22
23	872377	875737	879038	882282	885469	888600	891675	894696	23
24	872434	875793	879093	882336	885521	888651	891726	894746	24
25	0.872490	0.875848	0.879148	0.882389	0.885574	0.888703	0.891777	0.894796	25
26	872547	875904	879202	882443	885627	888755	891827	894846	26
27	872603	875959	879256	882496	885679	888806	891878	894895	27
28	872659	876014	879311	882550	885732	888858	891929	894945	28
29	872716	876070	879365	882603	885784	888910	891980	894995	29
30	0.872772	0.876125	0.879420	0.882657	0.885837	0.888961	0.892030	0.895045	30
31	872829	876181	879474	882710	885889	889013	892081	895095	31
32	872885	876236	879529	882764	885942	889064	892132	895145	32
33	872941	876291	879583	882817	885994	889116	892182	895194	33
34	872998	876347	879637	882871	886047	889167	892233	895244	34
35	0.873054	0.876402	0.879692	0.882924	0.886099	0.889219	0.892284	0.895294	35
36	873110	876457	879746	882977	886152	889271	892334	895343	36
37	873166	876513	879801	883031	886204	889322	892385	895393	37
38	873223	876568	879855	883084	886257	889374	892435	895443	38
39	873279	876623	879909	883137	886309	889425	892486	895492	39
40	0.873335	0.876678	0.879963	0.883191	0.886362	0.889476	0.892536	0.895542	40
41	873391	876734	880018	883244	886414	889528	892587	895592	41
42	873448	876789	880072	883297	886466	889579	892637	895641	42
43	873504	876844	880126	883351	886519	889631	892688	895691	43
44	873560	876899	880180	883404	886571	889682	892738	895741	44
45	0.873616	0.876954	0.880234	0.883457	0.886623	0.889734	0.892789	0.895790	45
46	873672	877010	880289	883510	886676	889785	892839	895840	46
47	873728	877065	880343	883564	886728	889836	892890	895889	47
48	873784	877120	880397	883617	886780	889888	892940	895939	48
49	873840	877175	880451	883670	886832	889939	892991	895988	49
50	0.873896	0.877230	0.880505	0.883723	0.886885	0.889990	0.893041	0.896038	50
51	873952	877285	880559	883776	886937	890042	893092	896087	51
52	874009	877340	880613	883829	886989	890093	893142	896137	52
53	874065	877395	880667	883883	887041	890144	893192	896186	53
54	874121	877450	880722	883936	887093	890195	893243	896236	54
55	0.874176	0.877505	0.880776	0.883989	0.887145	0.890247	0.893293	0.896285	55
56	874232	877560	880830	884042	887198	890298	893343	896335	56
57	874288	877615	880884	884095	887250	890349	893394	896384	57
58	874344	877670	880938	884148	887302	890400	893444	896433	58
59	874400	877725	880992	884201	887354	890451	893494	896483	59

TABLE XXIII.

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE.								M.
	104°	105°	106°	107°	108°	109°	110°	111°	
0	0.896532	0.899467	0.902349	0.905179	0.907958	0.910686	0.913364	0.915994	0
1	896581	899515	902396	905225	908003	910731	913409	916037	1
2	896631	899564	902444	905272	908049	910776	913453	916080	2
3	896680	899612	902491	905319	908095	910821	913497	916124	3
4	896729	899660	902539	905366	908141	910866	913541	916167	4
5	0.896779	0.899709	0.902586	0.905412	0.908187	0.910911	0.913585	0.916211	5
6	896828	899757	902634	905459	908233	910956	913630	916254	6
7	896877	899806	902681	905506	908278	911001	913674	916297	7
8	896926	899854	902729	905552	908324	911046	913718	916341	8
9	896976	899902	902776	905599	908370	911091	913762	916384	9
10	0.897025	0.899951	0.902824	0.905645	0.908416	0.911136	0.913806	0.916427	10
11	897074	899999	902871	905692	908462	911181	913850	916470	11
12	897123	900047	902919	905739	908507	911226	913894	916514	12
13	897172	900095	902966	905785	908553	911271	913938	916557	13
14	897222	900144	903014	905832	908599	911315	913982	916600	14
15	0.897271	0.900192	0.903061	0.905878	0.908644	0.911360	0.914026	0.916643	15
16	897320	900240	903108	905925	908690	911405	914070	916687	16
17	897369	900288	903156	905971	908736	911450	914114	916730	17
18	897418	900337	903203	906018	908781	911495	914158	916773	18
19	897467	900385	903250	906064	908827	911540	914202	916816	19
20	0.897516	0.900433	0.903298	0.906111	0.908873	0.911584	0.914246	0.916859	20
21	897565	900481	903345	906157	908918	911629	914290	916902	21
22	897614	900529	903392	906204	908964	911674	914334	916945	22
23	897663	900578	903440	906250	909009	911719	914378	916989	23
24	897712	900626	903487	906296	909055	911763	914422	917032	24
25	0.897761	0.900674	0.903534	0.906343	0.909101	0.911808	0.914466	0.917075	25
26	897810	900722	903581	906389	909146	911853	914510	917118	26
27	897859	900770	903628	906435	909192	911897	914554	917161	27
28	897908	900818	903676	906482	909237	911942	914598	917204	28
29	897957	900866	903723	906528	909283	911987	914641	917247	29
30	0.898006	0.900914	0.903770	0.906575	0.909328	0.912031	0.914685	0.917290	30
31	898055	900962	903817	906621	909374	912076	914729	917333	31
32	898104	901010	903864	906667	909419	912121	914773	917376	32
33	898153	901058	903911	906713	909464	912165	914817	917419	33
34	898202	901106	903959	906760	909510	912210	914860	917462	34
35	0.898250	0.901154	0.904006	0.906806	0.909555	0.912254	0.914904	0.917505	35
36	898299	901202	904053	906852	909601	912299	914948	917548	36
37	898348	901250	904100	906898	909646	912344	914992	917591	37
38	898397	901298	904147	906945	909691	912388	915035	917634	38
39	898446	901346	904194	906991	909737	912433	915079	917676	39
40	0.898494	0.901394	0.904241	0.907037	0.909782	0.912477	0.915123	0.917719	40
41	898543	901442	904288	907083	909827	912522	915166	917762	41
42	898592	901490	904335	907129	909873	912566	915210	917805	42
43	898641	901537	904382	907175	909918	912611	915254	917848	43
44	898689	901585	904429	907222	909963	912655	915297	917891	44
45	0.898738	0.901633	0.904476	0.907268	0.910009	0.912699	0.915341	0.917934	45
46	898787	901681	904523	907314	910054	912744	915385	917976	46
47	898835	901729	904570	907360	910099	912788	915428	918019	47
48	898884	901776	904617	907406	910144	912833	915472	918062	48
49	898933	901824	904664	907452	910190	912877	915515	918105	49
50	0.898981	0.901872	0.904711	0.907498	0.910235	0.912922	0.915559	0.918147	50
51	899030	901920	904757	907544	910280	912966	915602	918190	51
52	899078	901967	904804	907590	910325	913010	915646	918233	52
53	899127	902015	904851	907636	910370	913055	915689	918276	53
54	899176	902063	904898	907682	910415	913099	915733	918318	54
55	0.899224	0.902110	0.904945	0.907728	0.910461	0.913143	0.915776	0.918361	55
56	899273	902158	904992	907774	910506	913187	915820	918404	56
57	899321	902206	905038	907820	910551	913232	915863	918446	57
58	899370	902253	905085	907866	910596	913276	915907	918489	58
59	899418	902301	905132	907912	910641	913320	915950	918532	59

TABLE XXIII.

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE. 112°	113°	114°	115°	116°	117°	118°	119°	M.
0	0.918574	0.921107	0.923591	0.926029	0.928420	0.930766	0.933066	0.935320	0
1	918617	921148	923632	926069	928460	930804	933104	935358	1
2	918659	921190	923673	926110	928499	930843	933141	935395	2
3	918702	921232	923714	926150	928539	930882	933179	935432	3
4	918745	921274	923755	926190	928578	930921	933217	935469	4
5	0.918787	0.921315	0.923796	0.926230	0.928618	0.930959	0.933255	0.935506	5
6	918830	921357	923837	926270	928657	930998	933293	935543	6
7	918872	921399	923878	926311	928696	931036	933331	935581	7
8	918915	921441	923919	926351	928736	931075	933369	935618	8
9	918957	921482	923960	926391	928775	931114	933407	935655	9
10	0.919000	0.921524	0.924001	0.926431	0.928815	0.931152	0.933444	0.935692	10
11	919042	921566	924042	926471	928854	931191	933482	935729	11
12	919085	921607	924083	926511	928893	931229	933520	935766	12
13	919127	921649	924124	926551	928932	931268	933558	935803	13
14	919169	921691	924164	926591	928972	931306	933596	935840	14
15	0.919212	0.921732	0.924205	0.926631	0.929011	0.931345	0.933633	0.935877	15
16	919254	921774	924246	926671	929050	931383	933671	935914	16
17	919297	921815	924287	926711	929090	931422	933709	935951	17
18	919339	921857	924328	926751	929129	931460	933747	935988	18
19	919381	921899	924368	926791	929168	931499	933784	936025	19
20	0.919424	0.921940	0.924409	0.926831	0.929207	0.931537	0.933822	0.936062	20
21	919466	921982	924450	926871	929247	931576	933860	936099	21
22	919508	922023	924491	926911	929286	931614	933898	936136	22
23	919551	922065	924531	926951	929325	931653	933935	936173	23
24	919593	922106	924572	926991	929364	931691	933973	936210	24
25	0.919635	0.922148	0.924613	0.927031	0.929403	0.931729	0.934011	0.936247	25
26	919677	922189	924654	927071	929442	931768	934048	936284	26
27	919720	922231	924694	927111	929482	931806	934086	936320	27
28	919762	922272	924735	927151	929521	931845	934123	936357	28
29	919804	922313	924776	927191	929560	931883	934161	936394	29
30	0.919846	0.922355	0.924816	0.927231	0.929599	0.931921	0.934199	0.936431	30
31	919889	922396	924857	927270	929638	931960	934236	936468	31
32	919931	922438	924897	927310	929677	931998	934274	936505	32
33	919973	922479	924938	927350	929716	932036	934311	936541	33
34	920015	922520	924979	927390	929755	932075	934349	936578	34
35	0.920057	0.922562	0.925019	0.927430	0.929794	0.932113	0.934386	0.936615	35
36	920099	922603	925060	927470	929833	932151	934424	936652	36
37	920141	922644	925100	927509	929872	932189	934461	936689	37
38	920184	922686	925141	927549	929911	932228	934499	936725	38
39	920226	922727	925181	927589	929950	932266	934536	936762	39
40	0.920268	0.922768	0.925222	0.927629	0.929989	0.932304	0.934574	0.936799	40
41	920310	922810	925262	927668	930028	932342	934611	936835	41
42	920352	922851	925303	927708	930067	932380	934649	936872	42
43	920394	922892	925343	927748	930106	932419	934686	936909	43
44	920436	922933	925384	927787	930145	932457	934723	936946	44
45	0.920478	0.922975	0.925424	0.927827	0.930184	0.932495	0.934761	0.936982	45
46	920520	923016	925465	927867	930223	932533	934798	937019	46
47	920562	923057	925505	927906	930262	932571	934836	937055	47
48	920604	923098	925545	927946	930300	932609	934873	937092	48
49	920646	923139	925586	927985	930339	932647	934910	937129	49
50	0.920688	0.923181	0.925626	0.928025	0.930378	0.932685	0.934948	0.937165	50
51	920730	923222	925666	928065	930417	932723	934985	937202	51
52	920772	923263	925707	928104	930456	932762	935022	937238	52
53	920814	923304	925747	928144	930495	932800	935060	937275	53
54	920855	923345	925788	928183	930533	932838	935097	937312	54
55	0.920897	0.923386	0.925828	0.928223	0.930572	0.932876	0.935134	0.937348	55
56	920939	923427	925868	928263	930611	932914	935171	937385	56
57	920981	923468	925908	928302	930650	932952	935209	937421	57
58	921023	923509	925949	928342	930688	932990	935246	937458	58
59	921065	923550	925989	928381	930727	933028	935283	937494	59

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE. 120°	121°	122°	123°	124°	125°	126°	127°	M.
0	0.937531	0.939697	0.941819	0.943899	0.945935	0.947929	0.949881	0.951791	0
1	937567	939732	941854	943933	945968	947962	949913	951823	1
2	937604	939768	941889	943967	946002	947995	949945	951854	2
3	937640	939804	941924	944001	946036	948027	949977	951886	3
4	937676	939840	941959	944036	946069	948060	950009	951917	4
5	0.937713	0.939875	0.941994	0.944070	0.946103	0.948093	0.950042	0.951948	5
6	937749	939911	942029	944104	946136	948126	950074	951980	6
7	937786	939947	942064	944138	946170	948159	950106	952011	7
8	937822	939982	942099	944172	946203	948192	950138	952043	8
9	937858	940018	942134	944207	946237	948224	950170	952074	9
10	0.937895	0.940053	0.942169	0.944241	0.946271	0.948257	0.950202	0.952105	10
11	937931	940089	942204	944275	946304	948290	950234	952137	11
12	937967	940125	942239	944309	946337	948323	950266	952168	12
13	938004	940160	942273	944343	946370	948355	950298	952200	13
14	938040	940196	942308	944377	946404	948388	950330	952231	14
15	0.938076	0.940231	0.942343	0.944412	0.946437	0.948421	0.950362	0.952262	15
16	938113	940267	942378	944446	946471	948454	950394	952294	16
17	938149	940303	942413	944480	946504	948486	950426	952325	17
18	938185	940338	942448	944514	946538	948519	950458	952356	18
19	938221	940374	942482	944548	946571	948552	950490	952387	19
20	0.938258	0.940409	0.942517	0.944582	0.946604	0.948584	0.950522	0.952419	20
21	938294	940445	942552	944616	946638	948617	950554	952450	21
22	938330	940480	942587	944650	946671	948650	950586	952481	22
23	938366	940515	942621	944684	946704	948682	950618	952512	23
24	938402	940551	942656	944718	946738	948715	950650	952544	24
25	0.938438	0.940586	0.942691	0.944752	0.946771	0.948747	0.950682	0.952575	25
26	938475	940622	942725	944786	946804	948780	950714	952606	26
27	938511	940657	942760	944820	946837	948812	950746	952637	27
28	938547	940693	942795	944854	946871	948845	950778	952669	28
29	938583	940728	942830	944888	946904	948878	950809	952700	29
30	0.938619	0.940763	0.942864	0.944922	0.946937	0.948910	0.950841	0.952731	30
31	938655	940799	942899	944956	946970	948943	950873	952762	31
32	938691	940834	942934	944990	947004	948975	950905	952793	32
33	938727	940869	942968	945024	947037	949008	950937	952824	33
34	938763	940905	943003	945058	947070	949040	950968	952855	34
35	0.938799	0.940940	0.943037	0.945092	0.947103	0.949073	0.951000	0.952886	35
36	938836	940975	943072	945125	947136	949105	951032	952918	36
37	938872	941011	943106	945159	947169	949138	951064	952949	37
38	938908	941046	943141	945193	947203	949170	951096	952980	38
39	938944	941081	943176	945227	947236	949202	951127	953011	39
40	0.938980	0.941117	0.943210	0.945261	0.947269	0.949235	0.951159	0.953042	40
41	939016	941152	943245	945295	947302	949267	951191	953073	41
42	939051	941187	943279	945328	947335	949300	951222	953104	42
43	939087	941222	943314	945362	947368	949332	951254	953135	43
44	939123	941258	943348	945396	947401	949364	951285	953166	44
45	0.939159	0.941293	0.943383	0.945430	0.947434	0.949397	0.951317	0.953197	45
46	939195	941328	943417	945464	947467	949429	951349	953228	46
47	939231	941363	943452	945497	947500	949461	951381	953259	47
48	939267	941398	943486	945531	947533	949494	951412	953290	48
49	939303	941433	943520	945565	947566	949526	951444	953321	49
50	0.939339	0.941469	0.943555	0.945598	0.947600	0.949558	0.951476	0.953352	50
51	939375	941504	943589	945632	947632	949591	951507	953382	51
52	939410	941539	943624	945666	947665	949623	951539	953413	52
53	939446	941574	943658	945699	947698	949655	951570	953444	53
54	939482	941609	943693	945733	947731	949688	951602	953475	54
55	0.939518	0.941644	0.943727	0.945767	0.947764	0.949720	0.951634	0.953506	55
56	939554	941679	943761	945800	947797	949752	951665	953537	56
57	939589	941714	943796	945834	947830	949784	951697	953568	57
58	939625	941749	943830	945868	947863	949816	951728	953599	58
59	939661	941784	943864	945901	947896	949849	951760	953629	59

TABLE XXIII.

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE. 128°	129°	130°	131°	132°	133°	134°	135°	M.
0	0.953660	0.955488	0.957276	0.959023	0.960730	0.962398	0.964026	0.965615	0
1	953691	955518	957306	959052	960758	962425	964053	965641	1
2	953722	955548	957335	959081	960786	962453	964080	965668	2
3	953753	955579	957364	959109	960814	962480	964106	965694	3
4	953783	955609	957393	959138	960843	962508	964133	965720	4
5	0.953814	0.955639	0.957423	0.959167	0.960871	0.962535	0.964160	0.965746	5
6	953845	955669	957452	959195	960899	962562	964187	965772	6
7	953876	955699	957482	959224	960927	962590	964213	965798	7
8	953906	955729	957511	959253	960955	962617	964240	965824	8
9	953937	955759	957540	959281	960983	962644	964267	965850	9
10	0.953968	0.955789	0.957570	0.959310	0.961011	0.962672	0.964294	0.965876	10
11	953998	955819	957599	959339	961039	962699	964320	965902	11
12	954029	955849	957628	959368	961067	962727	964347	965928	12
13	954060	955879	957658	959396	961095	962754	964374	965955	13
14	954090	955909	957687	959425	961123	962781	964400	965981	14
15	0.954121	0.955939	0.957716	0.959453	0.961151	0.962808	0.964427	0.966007	15
16	954152	955969	957746	959482	961179	962836	964454	966033	16
17	954182	955999	957775	959511	961207	962863	964480	966059	17
18	954213	956029	957804	959539	961235	962890	964507	966085	18
19	954243	956059	957833	959568	961262	962918	964534	966110	19
20	0.954274	0.956089	0.957863	0.959596	0.961290	0.962945	0.964560	0.966136	20
21	954305	956118	957892	959625	961318	962972	964587	966162	21
22	954335	956148	957921	959654	961346	962999	964613	966188	22
23	954366	956178	957950	959682	961374	963027	964640	966214	23
24	954396	956208	957979	959711	961402	963054	964666	966240	24
25	0.954427	0.956238	0.958009	0.959739	0.961430	0.963081	0.964693	0.966266	25
26	954457	956268	958038	959768	961458	963108	964719	966292	26
27	954488	956298	958067	959796	961485	963135	964746	966318	27
28	954518	956327	958096	959825	961513	963163	964773	966344	28
29	954549	956357	958125	959853	961541	963190	964799	966370	29
30	0.954579	0.956387	0.958154	0.959882	0.961569	0.963217	0.964826	0.966395	30
31	954610	956417	958183	959910	961597	963244	964852	966421	31
32	954640	956447	958212	959938	961624	963271	964879	966447	32
33	954671	956476	958242	959967	961652	963298	964905	966473	33
34	954701	956506	958271	959995	961680	963325	964931	966499	34
35	0.954731	0.956536	0.958300	0.960024	0.961708	0.963352	0.964958	0.966524	35
36	954762	956566	958329	960052	961735	963379	964984	966550	36
37	954792	956595	958358	960080	961763	963406	965010	966576	37
38	954823	956625	958387	960109	961791	963434	965037	966602	38
39	954853	956655	958416	960137	961819	963461	965063	966628	39
40	0.954883	0.956684	0.958445	0.960165	0.961846	0.963488	0.965090	0.966653	40
41	954914	956714	958474	960194	961874	963515	965116	966679	41
42	954944	956744	958503	960222	961902	963542	965143	966705	42
43	954974	956773	958532	960250	961929	963569	965169	966730	43
44	955005	956803	958561	960279	961957	963596	965195	966756	44
45	0.955035	0.956833	0.958590	0.960307	0.961985	0.963623	0.965222	0.966782	45
46	955065	956862	958619	960335	962012	963650	965248	966808	46
47	955096	956892	958648	960364	962040	963677	965274	966833	47
48	955126	956921	958677	960392	962067	963704	965301	966859	48
49	955156	956951	958706	960420	962095	963730	965327	966884	49
50	0.955186	0.956981	0.958734	0.960448	0.962123	0.963757	0.965353	0.966910	50
51	955217	957010	958763	960477	962150	963784	965379	966936	51
52	955247	957040	958792	960505	962178	963811	965406	966961	52
53	955277	957069	958821	960533	962205	963838	965432	966987	53
54	955307	957099	958850	960561	962233	963865	965458	967013	54
55	0.955337	0.957128	0.958879	0.960589	0.962260	0.963892	0.965484	0.967038	55
56	955368	957158	958908	960618	962288	963919	965511	967064	56
57	955398	957187	958936	960646	962315	963946	965537	967089	57
58	955428	957217	958965	960674	962343	963972	965563	967115	58
59	955458	957246	958994	960702	962370	963999	965589	967140	59

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE. 136°	137°	138°	139°	140°	141°	142°	143°	M.
0	0.967166	0.968678	0.970152	0.971588	0.972986	0.974347	0.975670	0.976957	0
1	967191	968703	970176	971611	973009	974369	975692	976978	1
2	967217	968728	970200	971635	973032	974391	975714	976999	2
3	967242	968752	970224	971658	973055	974414	975735	977020	3
4	967268	968777	970249	971682	973078	974436	975757	977041	4
5	0.967293	0.968802	0.970273	0.971706	0.973101	0.974458	0.975779	0.977062	5
6	967319	968827	970297	971729	973124	974481	975800	977083	6
7	967344	968852	970321	971753	973146	974503	975822	977104	7
8	967370	968877	970345	971776	973169	974525	975844	977125	8
9	967395	968901	970369	971800	973192	974547	975865	977146	9
10	0.967421	0.968926	0.970394	0.971823	0.973215	0.974570	0.975887	0.977167	10
11	967446	968951	970418	971847	973238	974592	975909	977188	11
12	967471	968976	970442	971870	973261	974614	975930	977209	12
13	967497	969001	970466	971894	973284	974636	975952	977230	13
14	967522	969025	970490	971917	973307	974659	975974	977251	14
15	0.967547	0.969050	0.970514	0.971941	0.973329	0.974681	0.975995	0.977272	15
16	967573	969075	970538	971964	973352	974703	976017	977293	16
17	967598	969099	970562	971988	973375	974725	976038	977314	17
18	967624	969124	970586	972011	973398	974747	976060	977335	18
19	967649	969149	970610	972034	973421	974770	976081	977356	19
20	0.967674	0.969173	0.970635	0.972058	0.973444	0.974792	0.976103	0.977377	20
21	967699	969198	970659	972081	973466	974814	976124	977398	21
22	967725	969223	970684	972105	973489	974836	976146	977419	22
23	967750	969247	970707	972128	973512	974858	976168	977440	23
24	967775	969272	970731	972151	973535	974880	976189	977461	24
25	0.967800	0.969297	0.970755	0.972175	0.973557	0.974902	0.976211	0.977482	25
26	967820	969321	970779	972198	973580	974925	976232	977503	26
27	967851	969346	970803	972221	973603	974947	976254	977523	27
28	967876	969370	970826	972245	973625	974969	976275	977544	28
29	967901	969395	970850	972268	973648	974991	976296	977565	29
30	0.967927	0.969420	0.970874	0.972291	0.973671	0.975013	0.976318	0.977586	30
31	967952	969444	970898	972315	973693	975035	976339	977607	31
32	967977	969469	970922	972338	973716	975057	976361	977628	32
33	968002	969493	970946	972361	973739	975079	976382	977648	33
34	968027	969518	970970	972385	973761	975101	976404	977669	34
35	0.968052	0.969542	0.970994	0.972408	0.973784	0.975123	0.976425	0.977690	35
36	968078	969567	971018	972431	973807	975145	976446	977711	36
37	968103	969591	971042	972454	973829	975167	976468	977732	37
38	968128	969616	971066	972478	973852	975189	976489	977752	38
39	968153	969640	971089	972501	973874	975211	976510	977773	39
40	0.968178	0.969665	0.971113	0.972524	0.973897	0.975233	0.976532	0.977794	40
41	968203	969689	971137	972547	973920	975255	976553	977814	41
42	968228	969714	971161	972570	973942	975277	976574	977835	42
43	968253	969738	971185	972593	973965	975299	976596	977856	43
44	968278	969762	971208	972617	973987	975321	976617	977877	44
45	0.968303	0.969787	0.971232	0.972640	0.974010	0.975343	0.976638	0.977897	45
46	968329	969811	971256	972663	974032	975365	976660	977918	46
47	968354	969836	971280	972686	974055	975386	976681	977939	47
48	968379	969860	971303	972709	974077	975408	976702	977959	48
49	968404	969884	971327	972732	974100	975430	976723	977980	49
50	0.968429	0.969909	0.971351	0.972755	0.974122	0.975452	0.976745	0.978001	50
51	968453	969933	971375	972778	974145	975474	976766	978021	51
52	968479	969957	971398	972802	974167	975496	976787	978042	52
53	968503	969982	971422	972825	974190	975518	976808	978062	53
54	968528	970006	971446	972848	974212	975539	976830	978083	54
55	0.968553	0.970030	0.971469	0.972871	0.974235	0.975561	0.976851	0.978104	55
56	968578	970055	971493	972894	974257	975583	976871	978124	56
57	968603	970079	971517	972917	974279	975605	976893	978145	57
58	968628	970103	971540	972940	974302	975627	976914	978165	58
59	968653	970127	971564	972963	974324	975648	976935	978186	59

TABLE XXIII.

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE. 144°	145°	146°	147°	148°	149°	150°	151°	M.
0	0.978206	0.979419	0.980596	0.981737	0.982842	0.983911	0.984944	0.985942	0
1	978227	979439	980616	981756	982860	983928	984961	985958	1
2	978247	979459	980635	981774	982878	983946	984978	985974	2
3	978268	979479	980654	981793	982896	983963	984994	985991	3
4	978288	979499	980673	981812	982914	983981	985011	986007	4
5	0.978309	0.979519	0.980693	0.981830	0.982932	0.983998	0.985028	0.986023	5
6	978329	979539	980712	981849	982950	984015	985045	986039	6
7	978350	979559	980731	981868	982968	984033	985062	986056	7
8	978370	979578	980750	981886	982986	984050	985079	986072	8
9	978391	979598	980770	981905	983004	984068	985096	986088	9
10	0.978411	0.979618	0.980789	0.981924	0.983022	0.984085	0.985113	0.986104	10
11	978431	979638	980808	981942	983040	984103	985129	986121	11
12	978452	979658	980827	981961	983058	984120	985146	986137	12
13	978472	979678	980846	981979	983076	984137	985163	986153	13
14	978493	979697	980866	981998	983094	984155	985180	986169	14
15	0.978513	0.979717	0.980885	0.982016	0.983112	0.984172	0.985196	0.986185	15
16	978533	979737	980904	982035	983130	984190	985213	986202	16
17	978554	979757	980923	982054	983148	984207	985230	986218	17
18	978574	979776	980942	982072	983166	984224	985247	986234	18
19	978594	979796	980961	982091	983184	984242	985264	986250	19
20	0.978615	0.979816	0.980981	0.982109	0.983202	0.984259	0.985280	0.986266	20
21	978635	979835	981000	982128	983220	984276	985297	986282	21
22	978655	979855	981019	982146	983238	984294	985314	986299	22
23	978676	979875	981038	982165	983256	984311	985330	986315	23
24	978696	979895	981057	982183	983273	984328	985347	986331	24
25	0.978716	0.979914	0.981076	0.982202	0.983291	0.984345	0.985364	0.986347	25
26	978736	979934	981095	982220	983309	984363	985380	986363	26
27	978757	979954	981114	982238	983327	984380	985397	986379	27
28	978777	979973	981133	982257	983345	984397	985414	986395	28
29	978797	979993	981152	982275	983363	984414	985430	986411	29
30	0.978817	0.980012	0.981171	0.982294	0.983381	0.984432	0.985447	0.986427	30
31	978838	980032	981190	982312	983398	984449	985464	986443	31
32	978858	980052	981209	982331	983416	984466	985480	986459	32
33	978878	980071	981228	982349	983434	984483	985497	986475	33
34	978898	980091	981247	982367	983452	984500	985514	986491	34
35	0.978918	0.980110	0.981266	0.982386	0.983469	0.984518	0.985530	0.986507	35
36	978939	980130	981285	982404	983487	984535	985547	986523	36
37	978959	980149	981304	982422	983505	984552	985563	986539	37
38	978979	980169	981323	982441	983523	984569	985580	986555	38
39	978999	980189	981342	982459	983540	984586	985596	986571	39
40	0.979019	0.980208	0.981361	0.982477	0.983558	0.984603	0.985613	0.986587	40
41	979039	980228	981380	982496	983576	984620	985629	986603	41
42	979059	980247	981399	982514	983594	984637	985646	986619	42
43	979079	980267	981417	982532	983611	984655	985662	986635	43
44	979100	980286	981436	982551	983629	984672	985679	986651	44
45	0.979120	0.980305	0.981455	0.982569	0.983647	0.984689	0.985695	0.986667	45
46	979140	980325	981474	982587	983664	984706	985712	986683	46
47	979160	980344	981493	982605	983682	984723	985728	986699	47
48	979180	980364	981512	982624	983700	984740	985745	986714	48
49	979200	980383	981530	982642	983717	984757	985761	986730	49
50	0.979220	0.980403	0.981549	0.982660	0.983735	0.984774	0.985778	0.986746	50
51	979240	980422	981568	982678	983752	984791	985794	986762	51
52	979260	980442	981587	982696	983770	984808	985811	986778	52
53	979280	980461	981606	982715	983788	984825	985827	986794	53
54	979300	980480	981625	982733	983805	984842	985843	986809	54
55	0.979320	0.980500	0.981643	0.982751	0.983823	0.984859	0.985860	0.986825	55
56	979340	980519	981662	982769	983840	984876	985876	986841	56
57	979360	980538	981681	982787	983858	984893	985893	986857	57
58	979380	980558	981699	982805	983875	984910	985909	986873	58
59	979400	980577	981718	982823	983893	984927	985925	986888	59

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE. 152°	153°	154°	155°	156°	157°	158°	159°	M.
0	0.986904	0.987832	0.988724	0.989582	0.990404	0.991193	0.991947	0.992666	0
1	986920	987847	988739	989595	990418	991206	991959	992678	1
2	986936	987862	988753	989609	990431	991218	991971	992690	2
3	986951	987877	988768	989623	990445	991231	991983	992701	3
4	986967	987892	988782	989637	990458	991244	991996	992713	4
5	0.986983	0.987907	0.988797	0.989651	0.990471	0.991257	0.992008	0.992725	5
6	986998	987922	988811	989665	990485	991270	992020	992736	6
7	987014	987937	988826	989679	990498	991282	992032	992748	7
8	987030	987952	988840	989693	990511	991295	992044	992759	8
9	987045	987968	988855	989707	990525	991308	992057	992771	9
10	0.987061	0.987983	0.988869	0.989721	0.990538	0.991321	0.992069	0.992783	10
11	987077	987998	988884	989735	990551	991333	992081	992794	11
12	987092	988013	988898	989749	990565	991346	992093	992806	12
13	987108	988028	988913	989763	990578	991359	992105	992817	13
14	987124	988043	988927	989777	990591	991372	992117	992829	14
15	0.987139	0.988058	0.988942	0.989790	0.990605	0.991384	0.992130	0.992841	15
16	987155	988073	988956	989804	990618	991397	992142	992852	16
17	987170	988088	988970	989818	990631	991410	992154	992864	17
18	987186	988103	988985	989832	990644	991422	992166	992875	18
19	987202	988118	988999	989846	990658	991435	992178	992887	19
20	0.987217	0.988133	0.989014	0.989860	0.990671	0.991448	0.992190	0.992898	20
21	987233	988148	989028	989873	990684	991460	992202	992910	21
22	987248	988163	989042	989887	990697	991473	992214	992921	22
23	987264	988178	989057	989901	990711	991486	992226	992933	23
24	987279	988193	989071	989915	990724	991498	992239	992944	24
25	0.987295	0.988208	0.989085	0.989929	0.990737	0.991511	0.992251	0.992956	25
26	987310	988223	989100	989942	990750	991524	992263	992967	26
27	987326	988237	989114	989956	990763	991536	992275	992979	27
28	987341	988252	989128	989970	990777	991549	992287	992990	28
29	987357	988267	989143	989984	990790	991561	992299	993002	29
30	0.987372	0.988282	0.989157	0.989997	0.990803	0.991574	0.992311	0.993013	30
31	987388	988297	989171	990011	990816	991586	992323	993024	31
32	987403	988312	989186	990025	990829	991599	992335	993036	32
33	987419	988327	989200	990038	990842	991612	992347	993047	33
34	987434	988342	989214	990052	990855	991624	992358	993059	34
35	0.987449	0.988356	0.989228	0.990066	0.990868	0.991637	0.992370	0.993070	35
36	987465	988371	989243	990079	990882	991649	992382	993081	36
37	987480	988386	989257	990093	990895	991662	992394	993093	37
38	987496	988401	989271	990107	990908	991674	992406	993104	38
39	987511	988416	989285	990120	990921	991687	992418	993115	39
40	0.987526	0.988430	0.989300	0.990134	0.990934	0.991699	0.992430	0.993127	40
41	987542	988445	989314	990148	990947	991712	992442	993138	41
42	987557	988460	989328	990161	990960	991724	992454	993149	42
43	987572	988475	989342	990175	990973	991736	992466	993161	43
44	987588	988489	989356	990188	990986	991749	992478	993172	44
45	0.987603	0.988504	0.989370	0.990202	0.990999	0.991761	0.992489	0.993183	45
46	987618	988519	989384	990215	991012	991774	992501	993195	46
47	987634	988533	989399	990229	991025	991786	992513	993206	47
48	987649	988548	989413	990243	991038	991799	992525	993217	48
49	987664	988563	989427	990256	991051	991811	992537	993228	49
50	0.987679	0.988578	0.989441	0.990270	0.991064	0.991823	0.992549	0.993240	50
51	987695	988592	989455	990283	991077	991836	992560	993251	51
52	987710	988607	989469	990297	991090	991848	992572	993262	52
53	987725	988622	989483	990310	991102	991860	992584	993273	53
54	987740	988636	989497	990324	991115	991873	992596	993284	54
55	0.987756	0.988651	0.989511	0.990337	0.991128	0.991885	0.992607	0.993296	55
56	987771	988666	989525	990351	991141	991897	992619	993307	56
57	987786	988680	989539	990364	991154	991910	992631	993318	57
58	987801	988695	989553	990378	991167	991922	992643	993329	58
59	987816	988709	989567	990391	991180	991934	992654	993340	59

TABLE XXIII.

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE.								M.
	160°	161°	162°	163°	164°	165°	166°	167°	
0	0.993351	0.994003	0.994620	0.995203	0.995753	0.996269	0.996751	0.997199	0
1	993363	994013	994630	995213	995762	996277	996758	997206	1
2	993374	994024	994640	995222	995771	996285	996766	997214	2
3	993385	994034	994650	995231	995779	996293	996774	997221	3
4	993396	994045	994660	995241	995788	996302	996782	997228	4
5	0.993407	0.994055	0.994670	0.995250	0.995797	0.996310	0.996789	0.997235	5
6	993418	994066	994680	995260	995806	996318	996797	997242	6
7	993429	994076	994690	995269	995815	996327	996805	997249	7
8	993440	994087	994700	995278	995823	996335	996812	997257	8
9	993451	994097	994710	995288	995832	996343	996820	997264	9
10	0.993462	0.994108	0.994719	0.995297	0.995841	0.996351	0.996828	0.997271	10
11	993473	994118	994729	995306	995850	996359	996835	997278	11
12	993484	994129	994739	995316	995859	996368	996843	997285	12
13	993495	994139	994749	995325	995867	996376	996851	997292	13
14	993506	994150	994759	995334	995876	996384	996858	997299	14
15	0.993517	0.994160	0.994769	0.995344	0.995885	0.996392	0.996866	0.997306	15
16	993528	994171	994779	995353	995894	996400	996874	997313	16
17	993539	994181	994789	995362	995902	996409	996881	997320	17
18	993550	994191	994798	995372	995911	996417	996889	997327	18
19	993561	994202	994808	995381	995920	996425	996896	997334	19
20	0.993572	0.994212	0.994818	0.995390	0.995928	0.996433	0.996904	0.997341	20
21	993583	994223	994828	995399	995937	996441	996911	997348	21
22	993594	994233	994838	995409	995946	996449	996919	997355	22
23	993605	994243	994847	995418	995954	996457	996927	997362	23
24	993616	994254	994857	995427	995963	996465	996934	997369	24
25	0.993627	0.994264	0.994867	0.995436	0.995972	0.996473	0.996942	0.997376	25
26	993638	994274	994877	995446	995980	996482	996949	997383	26
27	993649	994285	994887	995455	995989	996490	996957	997390	27
28	993660	994295	994896	995464	995998	996498	996964	997397	28
29	993670	994305	994906	995473	996006	996506	996972	997404	29
30	0.993681	0.994316	0.994916	0.995482	0.996015	0.996514	0.996979	0.997411	30
31	993692	994326	994926	995491	996023	996522	996987	997418	31
32	993703	994336	994935	995501	996032	996530	996994	997425	32
33	993714	994346	994945	995510	996041	996538	997002	997432	33
34	993725	994357	994955	995519	996049	996546	997009	997439	34
35	0.993735	0.994367	0.994964	0.995528	0.996058	0.996554	0.997016	0.997445	35
36	993746	994377	994974	995537	996066	996562	997024	997452	36
37	993757	994387	994984	995546	996075	996570	997031	997459	37
38	993768	994398	994993	995554	996083	996578	997039	997466	38
39	993779	994408	995003	995564	996092	996586	997046	997473	39
40	0.993789	0.994418	0.995013	0.995573	0.996100	0.996594	0.997053	0.997480	40
41	993800	994428	995022	995582	996109	996602	997061	997487	41
42	993811	994438	995032	995591	996117	996610	997068	997493	42
43	993822	994448	995041	995600	996126	996618	997076	997500	43
44	993832	994459	995051	995610	996134	996625	997083	997507	44
45	0.993843	0.994469	0.995061	0.995619	0.996143	0.996633	0.997090	0.997514	45
46	993854	994479	995070	995628	996151	996641	997098	997520	46
47	993864	994489	995080	995637	996160	996649	997105	997527	47
48	993875	994499	995089	995646	996168	996657	997112	997534	48
49	993886	994509	995099	995655	996176	996665	997120	997541	49
50	0.993896	0.994519	0.995108	0.995664	0.996185	0.996673	0.997127	0.997547	50
51	993907	994529	995118	995672	996193	996680	997134	997554	51
52	993918	994540	995127	995681	996202	996688	997141	997561	52
53	993928	994550	995137	995690	996210	996696	997149	997568	53
54	993939	994560	995146	995699	996219	996704	997156	997574	54
55	0.993950	0.994570	0.995156	0.995708	0.996227	0.996712	0.997163	0.997581	55
56	993960	994580	995165	995717	996235	996720	997170	997588	56
57	993971	994590	995175	995726	996244	996727	997178	997594	57
58	993982	994600	995184	995735	996252	996735	997185	997601	58
59	993992	994610	995194	995744	996260	996743	997193	997608	59

TABLE XXIII.

Logarithms of the Sum and Difference.

M.	SUM OR DIFFERENCE. 168°	169°	170°	171°	172°	173°	174°	175°	M.
0	0.997614	0.997996	0.998344	0.998659	0.998941	0.999189	0.999404	0.999586	0
1	997621	998002	998350	998664	998945	999193	999408	999589	1
2	997628	998008	998355	998669	998950	999197	999411	999592	2
3	997634	998014	998361	998674	998954	999201	999414	999595	3
4	997641	998020	998366	998679	998958	999205	999418	999597	4
5	0.997647	0.998026	0.998372	0.998684	0.998963	0.999208	0.999421	0.999600	5
6	997654	998032	998377	998689	998967	999212	999424	999603	6
7	997661	998038	998383	998694	998971	999216	999427	999605	7
8	997667	998044	998388	998699	998976	999220	999431	999608	8
9	997674	998050	998394	998703	998980	999224	999434	999611	9
10	0.997680	0.998056	0.998399	0.998708	0.998984	0.999227	0.999437	0.999614	10
11	997687	998062	998404	998713	998989	999231	999440	999616	11
12	997693	998068	998410	998718	998993	999235	999443	999619	12
13	997700	998074	998415	998723	998997	999239	999447	999621	13
14	997706	998080	998421	998728	999002	999242	999450	999624	14
15	0.997713	0.998086	0.998426	0.998733	0.999006	0.999246	0.999453	0.999627	15
16	997719	998092	998431	998738	999010	999250	999456	999629	16
17	997726	998098	998437	998742	999015	999254	999459	999632	17
18	997732	998104	998442	998747	999019	999257	999463	999635	18
19	997739	998110	998448	998752	999023	999261	999466	999637	19
20	0.997745	0.998116	0.998453	0.998757	0.999027	0.999265	0.999469	0.999640	20
21	997752	998122	998458	998761	999031	999268	999472	999642	21
22	997758	998128	998464	998766	999036	999272	999475	999645	22
23	997765	998133	998469	998771	999040	999276	999478	999647	23
24	997771	998139	998474	998776	999044	999279	999481	999650	24
25	0.997777	0.998145	0.998479	0.998781	0.999048	0.999283	0.999484	0.999653	25
26	997784	998151	998485	998785	999053	999286	999487	999655	26
27	997790	998157	998490	998790	999057	999290	999490	999658	27
28	997797	998163	998495	998795	999061	999294	999493	999660	28
29	997803	998168	998501	998799	999065	999297	999496	999663	29
30	0.997809	0.998174	0.998506	0.998804	0.999069	0.999301	0.999500	0.999665	30
31	997816	998180	998511	998809	999073	999304	999503	999667	31
32	997822	998186	998516	998813	999077	999308	999506	999670	32
33	997828	998192	998522	998818	999082	999312	999509	999672	33
34	997835	998197	998527	998823	999086	999315	999512	999675	34
35	0.997841	0.998203	0.998532	0.998827	0.999090	0.999319	0.999515	0.999677	35
36	997847	998209	998537	998832	999094	999322	999518	999680	36
37	997854	998215	998542	998837	999098	999326	999521	999682	37
38	997860	998220	998548	998841	999102	999329	999524	999685	38
39	997866	998226	998553	998846	999106	999333	999526	999687	39
40	0.997872	0.998232	0.998558	0.998851	0.999110	0.999336	0.999529	0.999689	40
41	997879	998238	998563	998855	999114	999340	999532	999692	41
42	997885	998243	998568	998860	999118	999343	999535	999694	42
43	997891	998249	998573	998864	999122	999347	999538	999696	43
44	997897	998255	998578	998869	999126	999350	999541	999699	44
45	0.997904	0.998260	0.998583	0.998873	0.999130	0.999354	0.999544	0.999701	45
46	997910	998266	998589	998878	999134	999357	999547	999704	46
47	997916	998272	998594	998883	999138	999361	999550	999706	47
48	997922	998277	998599	998887	999142	999361	999553	999708	48
49	997928	998283	998604	998892	999146	999367	999556	999711	49
50	0.997935	0.998289	0.998609	0.998896	0.999150	0.999371	0.999558	0.999713	50
51	997941	998294	998614	998901	999154	999374	999561	999715	51
52	997947	998300	998619	998905	999158	999378	999564	999717	52
53	997953	998305	998624	998910	999162	999381	999567	999720	53
54	997959	998311	998629	998914	999166	999384	999570	999722	54
55	0.997965	0.998316	0.998634	0.998919	0.999170	0.999388	0.999572	0.999724	55
56	997972	998322	998639	998923	999174	999391	999575	999726	56
57	997978	998328	998644	998927	999178	999394	999578	999729	57
58	997984	998333	998649	998932	999181	999398	999581	999731	58
59	997990	998339	998654	998936	999185	999401	999584	999733	59

TABLE XXIV.

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
100	000000	000434	000868	001301	001734	002166	002598	003029	003460	003891	432
101	004321	004751	005180	005609	006038	006466	006894	007321	007748	008174	428
102	008600	009026	009451	009876	010300	010724	011147	011570	011993	012415	424
103	012837	013259	013680	014100	014520	014940	015360	015779	016197	016615	420
104	017033	017451	017868	018284	018700	019116	019532	019947	020361	020775	416
105	021189	021603	022016	022428	022841	023252	023664	024075	024486	024896	412
106	025306	025715	026124	026533	026942	027350	027757	028164	028571	028978	408
107	029384	029789	030195	030600	031004	031408	031812	032216	032619	033021	404
108	033424	033826	034227	034628	035029	035430	035830	036229	036629	037028	400
109	037426	037825	038223	038620	039017	039414	039811	040207	040602	040998	397
110	041393	041787	042182	042575	042969	043362	043755	044148	044540	044931	393
111	045323	045714	046105	046495	046885	047275	047664	048053	048442	048830	390
112	049218	049606	049993	050380	050766	051152	051538	051924	052309	052694	386
113	053078	053463	053846	054230	054613	054996	055378	055760	056142	056524	383
114	056905	057286	057666	058046	058426	058805	059185	059563	059942	060320	379
115	060698	061075	061452	061829	062206	062582	062958	063333	063709	064083	376
116	064458	064832	065206	065580	065953	066326	066699	067071	067443	067814	373
117	068186	068557	068928	069298	069668	070038	070407	070776	071145	071514	370
118	071882	072250	072617	072985	073352	073718	074085	074451	074816	075182	366
119	075547	075912	076276	076640	077004	077368	077731	078094	078457	078819	363
120	079181	079543	079904	080266	080626	080987	081347	081707	082067	082426	360
121	082785	083144	083503	083861	084219	084576	084934	085291	085647	086004	357
122	086360	086716	087071	087426	087781	088136	088490	088845	089198	089552	355
123	089905	090258	090611	090963	091315	091667	092018	092370	092721	093071	352
124	093422	093772	094122	094471	094820	095169	095518	095866	096215	096562	349
125	096910	097257	097604	097951	098297	098644	098990	099335	099681	100026	346
126	100370	100715	101059	101403	101747	102090	102434	102777	103119	103462	343
127	103804	104146	104487	104828	105169	105510	105851	106191	106531	106870	341
128	107210	107549	107888	108227	108565	108903	109241	109578	109916	110253	338
129	110590	110926	111262	111598	111934	112270	112605	112940	113275	113609	335

First Diff.	SECOND DIFFERENCE.																					First Diff.
	400	300	200	100	90	80	70	60	50	40	30	20	10	9	8	7	6	5	4	3	2	1	
432	926	694	463	231	208	185	162	139	116	093	069	046	023	021	019	016	014	012	009	007	005	002	432
428	934	701	467	234	210	187	164	140	117	093	070	047	023	021	019	016	014	012	009	007	005	002	428
424	943	708	472	236	212	189	165	142	118	094	071	047	024	021	019	017	014	012	009	007	005	002	424
420	952	714	476	238	214	190	167	143	119	095	071	048	024	021	019	017	014	012	010	007	005	002	420
416	962	721	481	240	216	192	168	144	120	096	072	048	024	022	019	017	014	012	010	007	005	002	416
412	971	728	485	243	218	194	170	146	121	097	073	049	024	022	019	017	015	012	010	007	005	002	412
408	980	735	490	245	221	196	172	147	123	098	074	049	025	022	020	017	015	012	010	007	005	002	408
404	990	742	495	248	223	198	173	149	124	099	074	050	025	022	020	017	015	012	010	007	005	002	404
400	1000	749	500	250	225	200	175	150	125	100	075	050	025	023	020	018	015	013	010	008	005	003	400
397		756	504	252	227	202	176	151	126	101	076	050	025	023	020	018	015	013	010	008	005	003	397
393		763	509	254	229	203	178	152	127	103	076	051	025	023	020	018	015	013	010	008	005	003	393
390		769	513	256	231	205	179	154	128	103	077	051	026	023	020	018	015	013	010	008	005	003	390
386		777	518	259	233	207	181	155	130	104	078	052	026	023	021	018	016	013	010	008	005	003	386
383		784	522	261	235	209	183	157	131	105	078	052	026	023	021	018	016	013	010	008	005	003	383
379		791	527	264	237	211	185	158	132	106	079	053	026	024	021	018	016	013	011	008	005	003	379
376		798	532	266	239	213	186	160	133	106	080	053	027	024	021	019	016	013	011	008	005	003	376
373		804	536	268	241	214	188	161	134	107	080	054	027	024	021	019	016	013	011	008	005	003	373
370		811	541	270	243	216	189	162	135	108	081	054	027	024	022	019	016	014	011	008	005	003	370
366		818	546	273	246	218	191	164	137	109	082	055	027	025	022	019	016	014	011	008	005	003	366
363		826	551	275	248	220	193	165	138	110	083	055	028	025	022	019	017	014	011	008	005	003	363
360		833	555	278	250	222	194	167	139	111	083	056	028	026	022	019	017	014	011	008	005	003	360
357		840	560	280	252	224	196	168	140	112	084	056	028	025	022	020	017	014	011	008	005	003	357
355		846	564	282	254	226	197	169	141	113	085	056	028	025	022	020	017	014	011	008	005	003	355
352		852	568	284	256	227	199	170	142	114	085	057	028	026	023	020	017	014	011	009	006	003	352
349		860	573	287	258	229	201	172	143	115	086	057	029	026	023	020	017	014	011	009	006	003	349
346		867	578	289	260	231	202	173	145	116	087	058	029	026	023	020	017	014	012	009	006	003	346
343		874	583	291	262	233	204	175	146	117	087	058	029	026	023	020	017	015	012	009	006	003	343
341		881	587	293	264	235	205	176	147	117	088	059	029	026	023	021	018	015	012	009	006	003	341
338		888	592	296	266	237	207	178	148	118	089	059	030	027	024	021	018	015	012	009	006	003	338
335		896	597	298	269	239	209	179	149	119	090	060	030	027	024	021	018	015	012	009	006	003	325

LOGARITHMS of NUMBERS.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
130	113943	114277	114611	114944	115278	115610	115943	116276	116608	116940	332
131	117271	117603	117934	118265	118595	118926	119256	119586	119915	120245	330
132	120574	120903	121231	121560	121888	122216	122543	122871	123198	123525	328
133	123852	124178	124504	124830	125156	125481	125806	126131	126456	126781	325
134	127105	127429	127752	128076	128399	128722	129045	129368	129690	130012	323
135	130334	130655	130977	131298	131619	131939	132260	132580	132900	133219	321
136	133539	133858	134177	134496	134814	135133	135451	135768	136086	136403	318
137	136721	137037	137354	137670	137987	138303	138618	138934	139249	139564	316
138	139879	140194	140508	140822	141136	141450	141763	142076	142389	142702	314
139	143015	143327	143639	143951	144263	144574	144885	145196	145507	145818	311
140	146128	146438	146748	147058	147367	147676	147985	148294	148603	148911	309
141	149219	149527	149835	150142	150449	150756	151063	151370	151676	151982	307
142	152288	152594	152900	153205	153510	153815	154119	154424	154728	155032	305
143	155336	155640	155943	156246	156549	156852	157154	157457	157759	158061	303
144	158362	158664	158965	159266	159567	159868	160168	160468	160768	161068	300
145	161368	161667	161967	162266	162564	162863	163161	163460	163757	164055	298
146	164353	164650	164947	165244	165541	165838	166134	166430	166726	167022	296
147	167317	167613	167908	168203	168497	168792	169086	169380	169674	169968	294
148	170262	170555	170848	171141	171434	171726	172018	172311	172603	172895	292
149	173186	173478	173769	174060	174351	174641	174932	175222	175512	175802	290
150	176091	176381	176670	176959	177248	177536	177825	178113	178401	178689	288
151	178977	179264	179552	179839	180126	180413	180699	180986	181272	181558	287
152	181844	182129	182415	182709	182985	183270	183554	183839	184123	184407	285
153	184691	184975	185259	185542	185825	186108	186391	186674	186956	187239	283
154	187521	187803	188084	188366	188647	188928	189209	189490	189771	190051	281
155	190332	190612	190892	191171	191451	191730	192010	192289	192567	192846	279
156	193125	193403	193681	193959	194237	194514	194792	195069	195346	195623	278
157	195900	196176	196452	196729	197005	197281	197556	197832	198107	198382	276
158	198657	198932	199206	199481	199755	200029	200303	200577	200850	201124	274
159	201397	201670	201943	202216	202488	202761	203033	203305	203577	203848	272

First Diff.	SECOND DIFFERENCE.																				First Diff.
	300	200	100	90	80	70	60	50	40	30	20	10	9	8	7	6	5	4	3	2	1	
332	903	602	301	271	241	211	181	151	120	090	060	030	027	024	021	018	015	012	009	006	003	332
330	909	606	303	273	242	212	182	152	121	091	061	030	027	024	021	018	015	012	009	006	003	330
328	915	610	305	275	244	213	183	153	122	091	061	030	027	025	021	018	015	012	009	006	003	328
325	922	615	308	277	246	215	185	154	123	092	062	031	028	025	022	018	015	012	009	006	003	325
323	929	619	310	279	248	217	186	155	124	093	062	031	028	025	022	019	015	012	009	006	003	323
321	935	623	312	281	249	218	187	156	125	093	062	031	028	025	022	019	016	012	009	006	003	321
318	942	628	314	283	251	220	189	157	126	094	063	031	028	025	022	019	016	013	009	006	003	318
316	949	633	316	285	253	221	190	158	127	095	063	032	029	025	022	019	016	013	009	006	003	316
314	956	638	318	287	255	223	191	159	128	096	064	032	029	025	022	019	016	013	010	006	003	314
311	964	643	321	289	257	225	193	161	129	096	064	032	029	026	023	019	016	013	010	006	003	311
309	971	648	324	291	259	227	194	162	130	097	065	032	029	026	023	019	016	013	010	006	003	309
307	977	652	326	293	261	228	195	163	130	098	065	033	029	026	023	020	016	013	010	007	003	307
305	984	656	328	295	262	229	197	164	131	098	066	033	030	026	023	020	016	013	010	007	003	305
303	990	661	330	297	264	231	198	165	132	099	066	033	030	026	023	020	016	013	010	007	003	303
300	1000	666	333	300	266	233	200	167	133	100	067	033	030	027	023	020	017	013	010	007	003	300
298		671	336	302	268	235	201	168	134	101	067	034	030	027	023	020	017	013	010	007	003	298
296		676	338	304	270	236	203	169	135	101	068	034	030	027	024	020	017	014	010	007	003	296
294		680	340	306	272	238	204	170	136	102	068	034	031	027	024	020	017	014	010	007	003	294
292		685	342	308	274	240	205	171	137	103	068	034	031	027	024	021	017	014	010	007	003	292
290		690	345	310	276	241	207	172	138	103	069	034	031	028	024	021	017	014	010	007	003	290
288		694	347	312	278	243	208	173	139	104	069	035	031	028	024	021	017	014	010	007	003	288
287		698	349	314	279	244	209	174	139	104	070	035	031	028	024	021	017	014	010	007	003	287
285		702	351	316	281	246	210	175	140	105	070	035	032	028	025	021	018	014	011	007	004	285
283		707	353	318	282	247	212	177	141	106	071	035	032	028	025	021	018	014	011	007	004	283
281		712	356	320	284	249	213	178	142	107	071	036	032	028	025	021	018	014	011	007	004	281
279		717	358	322	286	251	215	179	143	108	072	036	032	029	025	021	018	014	011	007	004	279
278		721	360	324	288	252	216	180	144	108	072	036	032	029	025	022	018	014	011	007	004	278
276		725	362	326	290	253	217	181	145	109	072	036	033	029	025	022	018	014	011	007	004	276
274		730	365	328	292	255	219	183	146	109	073	037	033	029	026	022	018	015	011	007	004	274
272		735	368	331	294	257	221	184	147	110	073	037	033	029	026	022	018	015	011	007	004	272

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
160	204120	204391	204662	204933	205204	205475	205745	206016	206286	206556	271
161	206826	207096	207365	207634	207904	208173	208441	208710	208979	209247	269
162	209515	209783	210051	210319	210586	210853	211121	211388	211654	211921	267
163	212188	212454	212720	212986	213252	213518	213783	214049	214314	214579	266
164	214844	215109	215373	215638	215902	216166	216430	216694	216957	217221	264
165	217484	217747	218010	218273	218536	218798	219060	219323	219585	219846	262
166	220108	220370	220631	220892	221153	221414	221675	221936	222196	222456	261
167	222717	222976	223236	223496	223756	224015	224274	224533	224792	225051	259
168	225309	225568	225826	226084	226342	226600	226858	227115	227372	227630	258
169	227887	228144	228400	228657	228913	229170	229426	229682	229938	230193	256
170	230449	230704	230960	231215	231470	231724	231979	232234	232488	232742	255
171	232996	233250	233504	233757	234011	234264	234517	234770	235023	235276	253
172	235528	235781	236033	236285	236537	236789	237041	237292	237544	237795	252
173	238046	238297	238548	238799	239049	239300	239550	239800	240050	240300	250
174	240549	240799	241048	241297	241547	241795	242044	242293	242541	242790	249
175	243038	243286	243534	243782	244030	244277	244525	244772	245019	245266	247
176	245513	245759	246006	246252	246499	246745	246991	247237	247482	247728	246
177	247973	248219	248464	248709	248954	249198	249443	249687	249932	250176	245
178	250420	250664	250908	251151	251395	251638	251882	252125	252368	252610	243
179	252853	253096	253338	253580	253822	254065	254306	554548	254790	255031	242
180	255273	255514	255755	255996	256237	256477	256718	256958	257198	257439	241
181	257679	257919	258158	258398	258637	258877	259116	259355	259594	259833	239
182	260071	260310	260548	260787	261025	261263	261501	261739	261976	262214	238
183	262451	262688	262926	263163	263399	263636	263873	264109	264346	264582	237
184	264818	265054	265290	265525	265761	265996	266232	266467	266702	266937	235
185	267172	267406	267641	267875	268110	268344	268578	268812	269046	269279	234
186	269513	269746	269980	270213	270446	270679	270912	271144	271377	271609	233
187	271842	272074	272306	272538	272770	273001	273233	273464	273696	273927	232
188	274158	274389	274620	274850	275081	275311	275542	275772	276002	276232	230
189	276462	276692	276921	277151	277380	277609	277838	278067	278296	278525	229

First Diff.	SECOND DIFFERENCE.																			First Diff.
	200	100	90	80	70	60	50	40	30	20	10	9	8	7	6	5	4	3	2	1	
271	74	37	33	30	26	22	18	15	11	07	04	03	03	03	02	02	01	01	01	00	271
269	74	37	33	30	26	22	19	15	11	07	04	03	03	03	02	02	01	01	01	00	269
267	75	38	34	30	26	22	19	15	11	07	04	03	03	03	02	02	01	01	01	00	267
266	75	38	34	30	26	23	19	15	11	08	04	03	03	03	02	02	02	01	01	00	266
264	76	38	34	30	26	23	19	15	11	08	04	03	03	03	02	02	02	01	01	00	264
262	76	38	34	30	27	23	19	15	11	08	04	03	03	03	02	02	02	01	01	00	262
261	77	38	34	31	27	23	19	15	11	08	04	03	03	03	02	02	02	01	01	00	261
259	77	39	35	31	27	23	19	15	12	08	04	03	03	03	02	02	02	01	01	00	259
258	77	39	35	31	27	23	19	15	12	08	04	03	03	03	02	02	02	01	01	00	258
256	78	39	35	31	27	23	19	16	12	08	04	04	03	03	02	02	02	01	01	00	256
255	78	39	35	31	27	24	20	16	12	08	04	04	03	03	02	02	02	01	01	00	255
253	79	39	35	32	28	24	20	16	12	08	04	04	03	03	02	02	02	01	01	00	253
252	79	40	36	32	28	24	20	16	12	08	04	04	03	03	02	02	02	01	01	00	252
250	80	40	36	32	28	24	20	16	12	08	04	04	03	03	02	02	02	01	01	00	250
249	80	40	36	32	28	24	20	16	12	08	04	04	03	03	02	02	02	01	01	00	249
247	81	40	36	32	28	24	20	16	12	08	04	04	03	03	02	02	02	01	01	00	247
246	81	41	37	32	28	24	20	16	12	08	04	04	03	03	02	02	02	01	01	00	246
245	82	41	37	33	29	25	20	16	12	08	04	04	03	03	02	02	02	01	01	00	245
243	82	41	37	33	29	25	21	16	12	08	04	04	03	03	02	02	02	01	01	00	243
242	83	41	37	33	29	25	21	17	12	08	04	04	03	03	02	02	02	01	01	00	242
241	83	41	37	33	29	25	21	17	12	08	04	04	03	03	02	02	02	01	01	00	241
239	84	42	38	33	29	25	21	17	13	08	04	04	03	03	02	02	02	01	01	00	239
238	84	42	38	34	29	25	21	17	13	08	04	04	03	03	03	02	02	01	01	00	238
237	84	42	38	34	30	25	21	17	13	08	04	04	03	03	03	02	02	01	01	00	237
235	85	42	38	34	30	26	21	17	13	09	04	04	03	03	03	02	02	01	01	00	235
234	85	43	38	34	30	26	21	17	13	09	04	04	03	03	03	02	02	01	01	00	234
233	86	43	39	34	30	26	22	17	13	09	04	04	03	03	03	02	02	01	01	00	233
232	86	43	39	35	30	26	22	17	13	09	04	04	03	03	03	02	02	01	01	00	232
230	87	44	39	35	30	26	22	17	13	09	04	04	03	03	03	02	02	01	01	00	230
229	87	44	39	35	31	27	22	17	13	09	04	04	03	03	03	02	02	01	01	00	229

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
190	278754	278982	279210	279439	279667	279895	280123	280351	280578	280806	228
191	281033	281261	281488	281715	281942	282169	282396	282622	282849	283075	227
192	283301	283527	283753	283979	284205	284431	284656	284882	285107	285332	226
193	285557	285782	286007	286232	286457	286681	286905	287130	287354	287578	224
194	287802	288026	288249	288473	288696	288920	289143	289366	289589	289812	223
195	290035	290257	290480	290702	290925	291147	291369	291591	291813	292034	222
196	292256	292478	292699	292920	293142	293363	293584	293804	294025	294246	221
197	294466	294687	294907	295127	295347	295567	295787	296007	296226	296446	220
198	296665	296885	297104	297323	297542	297761	297979	298198	298416	298635	219
199	298853	299071	299289	299507	299725	299943	300161	300378	300596	300813	218
200	301030	301247	301464	301681	301898	302114	302331	302547	302764	302980	217
201	303196	303412	303628	303844	304060	304275	304491	304706	304921	305136	216
202	305351	305566	305781	305996	306211	306425	306639	306854	307068	307282	214
203	307496	307710	307924	308137	308351	308564	308778	308991	309204	309417	213
204	309630	309843	310056	310268	310481	310693	310906	311118	311330	311542	212
205	311754	311966	312177	312389	312600	312812	313023	313234	313445	313656	211
206	313867	314078	314289	314499	314710	314920	315130	315341	315551	315761	210
207	315970	316180	316390	316599	316809	317018	317227	317437	317646	317855	209
208	318063	318272	318481	318689	318898	319106	319314	319523	319731	319938	208
209	320146	320354	320562	320769	320977	321184	321391	321599	321806	322012	207
210	322219	322426	322633	322839	323046	323252	323458	323665	323871	324077	206
211	324283	324488	324694	324900	325105	325310	325516	325721	325926	326131	205
212	326336	326541	326745	326950	327155	327359	327563	327768	327972	328176	204
213	328380	328583	328787	328991	329194	329398	329601	329805	330008	330211	203
214	330414	330617	330820	331022	331225	331427	331630	331832	332034	332236	202
215	332438	332640	332842	333044	333246	333447	333649	333850	334051	334253	202
216	334454	334655	334856	335057	335257	335458	335659	335859	336059	336260	201
217	336460	336660	336860	337060	337260	337459	337659	337858	338058	338257	200
218	338457	338656	338855	339054	339253	339451	339650	339849	340047	340246	199
219	340444	340642	340841	341039	341237	341435	341632	341830	342028	342225	198

First Diff.	SECOND DIFFERENCE.																			First Diff.
	200	100	90	80	70	60	50	40	30	20	10	9	8	7	6	5	4	3	2	1	
228	88	44	39	35	31	26	22	18	13	09	04	04	04	03	03	02	02	01	01	00	228
227	88	44	40	35	31	26	22	18	13	09	04	04	04	03	03	02	02	01	01	00	227
226	88	44	40	35	31	27	22	18	13	09	04	04	04	03	03	02	02	01	01	00	226
225	89	44	40	36	31	27	22	18	13	09	04	04	04	03	03	02	02	01	01	00	225
223	89	45	40	36	31	27	22	18	13	09	04	04	04	03	03	02	02	01	01	00	223
222	90	45	40	36	31	27	23	18	13	09	04	04	04	03	03	02	02	01	01	00	222
221	90	45	41	36	32	27	23	18	14	09	05	04	04	03	03	02	02	01	01	00	221
220	91	46	41	36	32	27	23	18	14	09	05	04	04	03	03	02	02	01	01	00	220
219	91	46	41	37	32	27	23	18	14	09	05	04	04	03	03	02	02	01	01	00	219
218	92	46	41	37	32	28	23	18	14	09	05	04	04	03	03	02	02	01	01	00	218
217	92	46	42	37	32	28	23	18	14	09	05	04	04	03	03	02	02	01	01	00	217
216	93	46	42	37	32	28	23	19	14	09	05	04	04	03	03	02	02	01	01	00	216
214	93	47	42	37	33	28	23	19	14	09	05	04	04	03	03	02	02	01	01	00	214
213	94	47	42	38	33	28	23	19	14	09	05	04	04	03	03	02	02	01	01	00	213
212	94	47	43	38	33	28	24	19	14	09	05	04	04	03	03	02	02	01	01	00	212
211	95	47	43	38	33	28	24	19	14	09	05	04	04	03	03	02	02	01	01	00	211
210	95	48	43	38	33	29	24	19	14	10	05	04	04	03	03	02	02	01	01	00	210
209	96	48	43	38	33	29	24	19	14	10	05	04	04	03	03	02	02	01	01	00	209
208	96	48	43	38	34	29	24	19	14	10	05	04	04	03	03	02	02	01	01	00	208
207	97	48	44	39	34	29	24	19	14	10	05	04	04	03	03	02	02	01	01	00	207
206	97	49	44	39	34	29	24	19	15	10	05	04	04	03	03	02	02	01	01	00	206
205	98	49	44	39	34	29	24	20	15	10	05	04	04	03	03	02	02	01	01	00	205
204	98	49	44	39	34	29	24	20	15	10	05	04	04	03	03	02	02	01	01	00	204
203	98	49	44	39	34	30	25	20	15	10	05	04	04	03	03	02	02	01	01	00	203
202	99	50	45	30	35	30	25	20	15	10	05	04	04	03	03	02	02	01	01	00	202
201	99	50	45	40	35	30	25	20	15	10	05	04	04	03	03	02	02	01	01	00	201
200	100	50	45	40	35	30	25	20	15	10	05	04	04	03	03	02	02	01	01	00	200
199		50	45	40	35	30	25	20	15	10	05	05	04	04	03	03	02	02	01	01	199
198		51	46	40	35	30	25	20	15	10	05	05	04	04	03	03	02	02	01	01	198

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
220	342423	342620	342817	343015	343212	343409	343606	343802	343999	344196	197
221	344392	344589	344785	344981	345178	345374	345570	345766	345962	346157	196
222	346353	346549	346744	346940	347135	347330	347525	347720	347915	348110	195
223	348305	348500	348694	348889	349083	349278	349472	349666	349860	350054	194
224	350248	350442	350636	350829	351023	351216	351410	351603	351796	351990	193
225	352183	352376	352568	352761	352954	353147	353339	353532	353724	353916	193
226	354108	354301	354493	354685	354876	355068	355260	355452	355643	355835	192
227	356026	356217	356408	356599	356791	356981	357172	357363	357554	357744	191
228	357935	358125	358316	358506	358696	358886	359076	359266	359456	359646	190
229	359835	360025	360215	360404	360593	360783	360972	361161	361350	361539	189
230	361728	361917	362105	362294	362483	362671	362859	363048	363236	363424	188
231	363612	363800	363988	364176	364363	364551	364739	364926	365113	365301	188
232	365488	365675	365862	366049	366236	366423	366610	366796	366983	367170	187
233	367356	367542	367729	367915	368101	368287	368473	368659	368845	369030	186
234	369216	369401	369587	369772	369958	370143	370328	370513	370698	370883	185
235	371068	371253	371437	371622	371807	371991	372175	372360	372544	372728	184
236	372912	373096	373280	373464	373648	373831	374015	374198	374382	374565	184
237	374748	374932	375115	375298	375481	375664	375846	376029	376212	376394	183
238	376577	376759	376942	377124	377306	377488	377670	377852	378034	378216	182
239	378398	378580	378761	378943	379124	379306	379487	279668	379849	380030	181
240	380211	380392	380573	380754	380935	381115	381296	381476	381657	381837	181
241	382017	382197	382377	382557	382737	382917	383097	383277	383456	383636	180
242	383815	383995	384174	384353	384533	384712	384891	385070	385249	385428	179
243	385606	385785	385964	386142	386321	386499	386677	386856	387034	387212	178
244	387390	387568	387746	387924	388101	388279	388457	388634	388811	388989	178
245	389166	389343	389521	389698	389875	390052	390228	390405	390582	390759	177
246	390935	391112	391288	391464	391641	391817	391993	392169	392345	392521	176
247	392697	392873	393049	393224	393400	393575	393751	393926	394101	394277	176
248	394452	394627	394802	394977	395152	395326	395501	395676	395850	396025	175
249	396199	396374	396548	396722	396896	397071	397245	397419	397592	397766	174

First Diff.	SECOND DIFFERENCE.																		First Diff.
	100	90	80	70	60	50	40	30	20	10	9	8	7	6	5	4	3	2	1	
197	51	46	41	36	31	25	20	15	10	05	05	04	04	03	03	02	02	01	01	197
196	51	46	41	36	31	26	20	15	10	05	05	04	04	03	03	02	02	01	01	196
195	51	46	41	36	31	26	21	15	10	05	05	04	04	03	03	02	02	01	01	195
194	52	46	41	36	31	26	21	15	10	05	05	04	04	03	03	02	02	01	01	194
193	52	47	41	36	31	26	21	16	10	05	05	04	04	03	03	02	02	01	01	193
192	52	47	42	36	31	26	21	16	10	05	05	04	04	03	03	02	02	01	01	192
191	52	47	42	37	31	26	21	16	10	05	05	04	04	03	03	02	02	01	01	191
190	53	47	42	37	32	26	21	16	11	05	05	04	04	03	03	02	02	01	01	190
189	53	48	42	37	32	26	21	16	11	05	05	04	04	03	03	02	02	01	01	189
188	53	48	43	37	32	27	21	16	11	05	05	04	04	03	03	02	02	01	01	188
187	53	48	43	37	32	27	21	16	11	05	05	04	04	03	03	02	02	01	01	187
186	54	48	43	38	32	27	21	16	11	05	05	04	04	03	03	02	02	01	01	186
185	54	49	43	38	32	27	22	16	11	05	05	04	04	03	03	02	02	01	01	185
184	54	49	43	38	33	27	22	16	11	05	05	04	04	03	03	02	02	01	01	184
183	55	49	44	38	33	27	22	16	11	05	05	04	04	03	03	02	02	01	01	183
182	55	49	44	38	33	28	22	16	11	05	05	04	04	03	03	02	02	01	01	182
181	55	50	44	39	33	28	22	17	11	06	05	04	04	03	03	02	02	01	01	181
180	56	50	44	39	33	28	22	17	11	06	05	04	04	03	03	02	02	01	01	180
179	56	50	45	39	34	28	22	17	11	06	05	04	04	03	03	02	02	01	01	179
178	56	51	45	39	34	28	22	17	11	06	05	04	04	03	03	02	02	01	01	178
177	56	51	45	40	34	28	23	17	11	06	05	05	04	03	03	02	02	01	01	177
176	57	51	45	40	34	28	23	17	11	06	05	05	04	03	03	02	02	01	01	176
175	57	51	46	40	34	29	23	17	11	06	05	05	04	03	03	02	02	01	01	175
174	57	52	46	40	34	29	23	17	11	06	05	05	04	03	03	02	02	01	01	174

TABLE XXIV.

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
250	397940	398114	398287	398461	398634	398808	398981	399154	399328	399501	173
251	399674	399847	400020	400193	400365	400538	400711	400883	401056	401228	173
252	401401	401573	401745	401917	402089	402261	402433	402605	402777	402949	172
253	403121	403292	403464	403635	403807	403978	404149	404321	404492	404663	171
254	404831	405005	405176	405346	405517	405688	405858	406029	406199	406370	171
255	406540	406711	406881	407051	407221	407391	407561	407731	407901	408070	170
256	408240	408410	408579	408749	408918	409087	409257	409426	409595	409764	169
257	409933	410102	410271	410440	410609	410777	410946	411114	411283	411451	169
258	411620	411788	411956	412124	412293	412461	412629	412796	412964	413132	168
259	413300	413467	413635	413803	413970	414137	414305	414472	414639	414806	167
260	414973	415140	415307	415474	415641	415808	415974	416141	416308	416474	167
261	416641	416807	416973	417139	417306	417472	417638	417804	417970	418136	166
262	418301	418467	418633	418798	418964	419129	419295	419460	419625	419791	165
263	419956	420121	420286	420451	420616	420781	420945	421110	421275	421439	165
264	421604	421768	421933	422097	422261	422426	422590	422754	422918	423082	164
265	423246	423410	423574	423737	423901	424065	424228	424392	424555	424718	164
266	424882	425045	425208	425371	425534	425697	425860	426023	426186	426349	163
267	426511	426674	426837	426999	427161	427324	427486	427648	427811	427973	162
268	428135	428297	428459	428621	428783	428944	429106	429268	429429	429591	162
269	429752	429914	430075	430236	430398	430559	430720	430881	431042	431203	161
270	431364	431525	431685	431846	432007	432167	432328	432488	432649	432809	160
271	432969	433130	433290	433450	433610	433770	433930	434090	434250	434409	160
272	434569	434729	434888	435048	435207	435367	435526	435685	435844	436004	159
273	436163	436322	436481	436640	436799	436957	437116	437275	437433	437592	159
274	437751	437909	438068	438226	438384	438542	438701	438859	439017	439175	158
275	439333	439491	439648	439806	439964	440122	440279	440437	440594	440752	158
276	440909	441066	441224	441381	441538	441695	441852	442009	442166	442323	157
277	442480	442637	442793	442950	443107	443263	443420	443576	443732	443889	157
278	444045	444201	444357	444513	444669	444825	444981	445137	445293	445449	156
279	445604	445760	445915	446071	446226	446382	446537	446693	446848	447003	155

First Diff.	SECOND DIFFERENCE.																		First Diff.
	100	90	80	70	60	50	40	30	20	10	9	8	7	6	5	4	3	2	1	
173	58	52	46	40	35	29	23	17	12	06	05	05	04	03	03	02	02	01	01	173
172	58	52	47	41	35	29	23	17	12	06	05	05	04	03	03	02	02	01	01	172
171	59	53	47	41	35	29	23	18	12	06	05	05	04	04	03	02	02	01	01	171
170	59	53	47	41	35	30	24	18	12	06	05	05	04	04	03	02	02	01	01	170
169	59	53	47	41	35	30	24	18	12	06	05	05	04	04	03	02	02	01	01	169
168	59	54	48	42	36	30	24	18	12	06	05	05	04	04	03	02	02	01	01	168
167	60	54	48	42	36	30	24	18	12	06	05	05	04	04	03	02	02	01	01	167
166	60	54	48	42	36	30	24	18	12	06	05	05	04	04	03	02	02	01	01	166
165	61	55	48	42	36	30	24	18	12	06	05	05	04	04	03	02	02	01	01	165
164	61	55	49	43	37	30	24	18	12	06	05	05	04	04	03	02	02	01	01	164
163	61	55	49	43	37	31	25	18	12	06	06	05	04	04	03	02	02	01	01	163
162	62	56	49	43	37	31	25	19	12	06	06	05	04	04	03	02	02	01	01	162
161	62	56	50	44	37	31	25	19	12	06	06	05	04	04	03	02	02	01	01	161
160	63	56	50	44	38	31	25	19	13	06	06	05	04	04	03	03	02	01	01	160
159	63	57	50	44	38	31	25	19	13	06	06	05	04	04	03	03	02	01	01	159
158	63	57	51	44	38	32	25	19	13	06	06	05	04	04	03	03	02	01	01	158
157	64	57	51	45	38	32	26	19	13	06	06	05	04	04	03	03	02	01	01	157
156	64	58	51	45	39	32	26	19	13	06	06	05	04	04	03	03	02	01	01	156
155	65	58	52	45	39	32	26	19	13	06	06	05	05	04	03	03	02	01	01	155

TABLE XXIV.

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
280	447158	447313	447468	447623	447778	447933	448088	448242	448397	448552	155
281	448706	448861	449015	449170	449324	449478	449633	449787	449941	450095	154
282	450249	450403	450557	450711	450865	451019	451172	451326	451479	451633	154
283	451786	451940	452093	452247	452400	452553	452706	452859	453012	453165	153
284	453318	453471	453624	453777	453930	454082	454235	454388	454540	454692	153
285	454845	454997	455150	455302	455454	455606	455758	455910	456062	456214	152
286	456366	456518	456670	456821	456973	457125	457276	457428	457579	457731	152
287	457882	458033	458184	458336	458487	458638	458789	458940	459091	459242	151
288	459393	459543	459694	459845	459995	460146	460296	460447	460597	460748	151
289	460898	461048	461198	461348	461499	461649	461799	461949	462098	462248	150
290	462398	462548	462697	462847	462997	463146	463296	463445	463594	463744	150
291	463893	464042	464191	464341	464490	464639	464788	464936	465085	465234	149
292	465383	465532	465680	465829	465977	466126	466274	466423	466571	466719	149
293	466868	467016	467164	467312	467460	467608	467756	467904	468052	468200	148
294	468347	468495	468643	468790	468938	469085	469233	469380	469528	469675	148
295	469822	469969	470116	470263	470411	470558	470704	470851	470998	471145	147
296	471292	471438	471585	471732	471878	472025	472171	472318	472464	472610	147
297	472756	472903	473049	473195	473341	473487	473633	473779	473925	474071	146
298	474216	474362	474508	474653	474799	474944	475090	475235	475381	475526	146
299	475671	475816	475962	476107	476252	476397	476542	476687	476832	476977	145
300	477121	477266	477411	477555	477700	477845	477989	478133	478278	478422	145
301	478567	478711	478855	478999	479143	479287	479431	479575	479719	479863	144
302	480007	480151	480295	480438	480582	480725	480869	481012	481156	481299	144
303	481443	481586	481729	481872	482016	482159	482302	482445	482588	482731	143
304	482874	483016	483159	483302	483445	483587	483730	483873	484015	484157	143
305	484300	484442	484585	484727	484869	485011	485153	485295	485438	485580	142
306	485721	485863	486005	486147	486289	486431	486572	486714	486855	486997	142
307	487138	487280	487421	487563	487704	487845	487986	488128	488269	488410	141
308	488551	488692	488833	488974	489114	489255	489396	489537	489677	489818	141
309	489959	490099	490240	490380	490520	490661	490801	490941	491081	491222	140
310	491362	491502	491642	491782	491922	492062	492202	492341	492481	492621	140
311	492761	492900	493040	493179	493319	493458	493597	493737	493876	494015	139
312	494155	494294	494433	494572	494711	494850	494989	495128	495267	495406	139
313	495544	495683	495822	495960	496099	196238	496376	496515	496653	496791	139
314	496930	497068	497206	497344	497483	497621	497759	497897	498035	498173	138
315	498311	498448	498586	498724	498862	498999	499137	499275	499412	499550	138
316	499687	499825	499962	500099	500237	500374	500511	500648	500785	500922	137
317	501059	501196	501333	501470	501607	501744	501881	502017	502154	502291	137
318	502427	502564	502700	502837	502973	503109	503246	503382	503518	503655	136
319	503791	503927	504063	504199	504335	504471	504607	504743	504879	505014	136

First Diff.	SECOND DIFFERENCE.																		First Diff.
	100	90	80	70	60	50	40	30	20	10	9	8	7	6	5	4	3	2	1	
155	65	58	52	45	39	32	26	19	13	06	06	05	05	04	03	03	02	01	01	155
154	65	58	52	45	39	32	26	19	13	06	06	05	05	04	03	03	02	01	01	154
153	65	59	52	46	39	33	26	20	13	07	06	05	05	04	03	03	02	01	01	153
152	66	59	53	46	39	33	26	20	13	07	06	05	05	04	03	03	02	01	01	152
151	66	60	53	46	40	33	27	20	13	07	06	05	05	04	03	03	02	01	01	151
150	67	60	53	47	40	33	27	20	13	07	06	05	05	04	03	03	02	01	01	150
149	67	60	54	47	40	34	27	20	13	07	06	05	05	04	03	03	02	01	01	149
148	67	61	54	47	41	34	27	20	13	07	06	05	05	04	03	03	02	01	01	148
147	68	61	54	48	41	34	27	20	14	07	06	05	05	04	03	03	02	01	01	147
146	68	62	55	48	41	34	27	21	14	07	06	05	05	04	03	03	02	01	01	146
145	69	62	55	48	41	34	28	21	14	07	06	05	05	04	03	03	02	01	01	145
144	69	62	55	48	42	35	28	21	14	07	06	05	05	04	03	03	02	01	01	144
143	70	63	56	49	42	35	28	21	14	07	06	05	05	04	03	03	02	01	01	143
142	70	63	56	49	42	35	28	21	14	07	06	06	05	04	04	03	02	01	01	142
141	71	64	57	50	43	36	28	21	14	07	06	06	05	04	04	03	02	01	01	141
140	71	64	57	50	43	36	29	21	14	07	06	06	05	04	04	03	02	01	01	140
139	72	65	58	50	43	36	29	22	14	07	06	06	05	04	04	03	02	01	01	139
138	72	65	58	51	43	36	29	22	14	07	07	06	05	04	04	03	02	01	01	138
137	73	66	58	51	44	37	29	22	15	07	07	06	05	04	04	03	02	01	01	137
136	74	66	59	51	44	37	29	22	15	07	07	06	05	04	04	03	02	01	01	136

TABLE XXIV.

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
320	505150	505286	505421	505557	505693	505828	505964	506099	506234	506370	136
321	506505	506640	506776	506911	507046	507181	507316	507451	507586	507721	135
322	507856	507991	508126	508260	508395	508530	508664	508799	508934	509068	135
323	509203	509337	509471	509606	509740	509874	510009	510143	510277	510411	134
324	510545	510679	510813	510947	511081	511215	511349	511482	511616	511750	134
325	511883	512017	512151	512284	512418	512551	512684	512818	512951	513084	133
326	513218	513351	513484	513617	513750	513883	514016	514149	514282	514415	133
327	514548	514681	514813	514946	515079	515211	515344	515476	515609	515741	133
328	515874	516006	516139	516271	516403	516535	516668	516800	516932	517064	132
329	517196	517328	517460	517592	517724	517855	517987	518119	518251	518382	132
330	518514	518646	518777	518909	519040	519172	519303	519434	519566	519697	131
331	519828	519959	520090	520221	520353	520484	520615	520746	520876	521007	131
332	521138	521269	521400	521530	521661	521792	521922	522053	522183	522314	131
333	522444	522575	522705	522835	522966	523096	523226	523356	523486	523616	130
334	523746	523876	524006	524136	524266	524396	524526	524656	524785	524915	130
335	525045	525174	525304	525434	525563	525693	525822	525951	526081	526210	129
336	526339	526469	526598	526727	526856	526985	527114	527243	527372	527501	129
337	527630	527759	527888	528016	528145	528274	528402	528531	528660	528788	129
338	528917	529045	529174	529302	529430	529559	529687	529815	529943	530072	128
339	530200	530328	530456	530584	530712	530840	530968	531096	531223	531351	128
340	531479	531607	531734	531862	531990	532117	532245	532372	532500	532627	128
341	532754	532882	533009	533136	533264	533391	533518	533645	533772	533899	127
342	534026	534153	534280	534407	534535	534661	534787	534914	535041	535168	127
343	535294	535421	535547	535674	535800	535927	536053	536180	536306	536432	126
344	536558	536685	536811	536937	537063	537189	537315	537441	537567	537693	126
345	537819	537945	538071	538197	538322	538448	538574	538699	538825	538951	126
346	539076	539202	539327	539453	539578	539703	539829	539954	540079	540204	125
347	540330	540455	540580	540705	540830	540955	541080	541205	541330	541454	125
348	541579	541704	541829	541954	542078	542203	542327	542452	542577	542701	125
349	542825	542950	543074	543199	543323	543447	543571	543696	543820	543944	124
350	544068	544192	544316	544440	544564	544688	544812	544936	545060	545183	124
351	545307	545431	545555	545678	545802	545925	546049	546172	546296	546419	124
352	546543	546666	546789	546913	547036	547159	547282	547406	547529	547652	123
353	547775	547898	548021	548144	548267	548389	548512	548635	548758	548881	123
354	549003	549126	549249	549371	549494	549616	549739	549861	549984	550106	123
355	550228	550351	550473	550595	550717	550840	550962	551084	551206	551328	122
356	551450	551572	551694	551816	551938	552060	552181	552303	552425	552547	122
357	552668	552790	552912	553033	553155	553276	553398	553519	553640	553762	121
358	553883	554004	554126	554247	554368	554489	554610	554731	554852	554973	121
359	555094	555215	555336	555457	555578	555699	555820	555940	556061	556182	121

First Diff.	SECOND DIFFERENCE.																		First Diff.
	100	90	80	70	60	50	40	30	20	10	9	8	7	6	5	4	3	2	1	
136	74	66	59	51	44	37	29	22	15	07	07	06	05	04	04	03	02	01	01	136
135	74	67	59	52	45	37	30	22	15	07	07	06	05	04	04	03	02	01	01	135
134	75	67	60	52	45	37	30	22	15	07	07	06	05	04	04	03	02	01	01	134
133	75	68	60	53	45	38	30	23	15	08	07	06	05	05	04	03	02	02	01	133
132	76	68	61	53	45	38	30	23	15	08	07	06	05	05	04	03	02	02	01	132
131	76	69	61	54	46	38	31	23	15	08	07	06	05	05	04	03	02	02	01	131
130	77	69	62	54	46	39	31	23	15	08	07	06	05	05	04	03	02	02	01	130
129	78	70	62	54	46	39	31	23	15	08	07	06	05	05	04	03	02	02	01	129
128	78	70	62	55	47	39	31	23	16	08	07	06	05	05	04	03	02	02	01	128
127	79	71	63	55	47	39	31	24	16	08	07	06	06	05	04	03	02	02	01	127
126	79	71	63	56	48	40	32	24	16	08	07	06	06	05	04	03	02	02	01	126
125	80	72	64	56	48	40	32	24	16	08	07	06	06	05	04	03	02	02	01	125
124	80	72	64	56	48	40	32	24	16	08	07	06	06	05	04	03	02	02	01	124
123	81	73	65	57	49	41	33	24	16	08	07	06	06	05	04	03	02	02	01	123
122	82	74	65	57	49	41	33	25	16	08	07	06	06	05	04	03	02	02	01	122
121	83	74	66	58	50	41	33	25	17	08	07	06	06	05	04	03	02	02	01	121

TABLE XXIV.

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
360	556303	556423	556544	556664	556785	556905	557026	557146	557267	557387	120
361	557507	557628	557748	557868	557988	558108	558228	558349	558469	558589	120
362	558709	558829	558948	559068	559188	559308	559428	559548	559667	559787	120
363	559907	560026	560146	560265	560385	560504	560624	560743	560863	560982	119
364	561101	561221	561340	561459	561578	561698	561817	561936	562055	562174	119
365	562293	562412	562531	562650	562769	562887	563006	563125	563244	563362	119
366	563481	563600	563718	563837	563956	564074	564193	564311	564429	564548	119
367	564666	564784	564903	565021	565139	565257	565376	565494	565612	565730	118
368	565848	565966	566084	566202	566320	566438	566555	566673	566791	566909	118
369	567026	567144	567262	567379	567497	567614	567732	567850	567967	568084	118
370	568202	568319	568436	568554	568671	568788	568905	569023	569140	569257	117
371	569374	569491	569608	569725	569842	569959	570076	570193	570309	570426	117
372	570543	570660	570776	570893	571010	571126	571243	571359	571476	571592	117
373	571709	571825	571942	572058	572174	572291	572407	572523	572639	572756	116
374	572872	572988	573104	573220	573336	573452	573568	573684	573800	573915	116
375	574031	574147	574263	574379	574494	574610	574726	574841	574957	575072	116
376	575188	575303	575419	575534	575650	575765	575880	575996	576111	576226	115
377	576341	576457	576572	576687	576802	576917	577032	577147	577262	577377	115
378	577492	577607	577722	577836	577951	578066	578181	578295	578410	578525	115
379	578639	578754	578868	578983	579097	579212	579326	579441	579555	579669	114
380	579784	579898	580012	580126	580241	580355	580469	580583	580697	580811	114
381	580925	581039	581153	581267	581381	581495	581608	581722	581836	581950	114
382	582063	582177	582291	582404	582518	582631	582745	582859	582972	583085	114
383	583199	583312	583426	583539	583652	583765	583879	583992	584105	584218	113
384	584331	584444	584557	584670	584783	584896	585009	585122	585235	585348	113
385	585461	585574	585686	585799	585912	586024	586137	586250	586362	586475	113
386	586587	586700	586812	586925	587037	587150	587262	587374	587487	587599	112
387	587711	587823	587935	588048	588160	588272	588384	588496	588608	588720	112
388	588832	588944	589056	589167	589279	589391	589503	589615	589726	589838	112
389	589950	590061	590173	590284	590396	590508	590619	590730	590842	590953	112
390	591065	591176	591287	591399	591510	591621	591732	591843	591955	592066	111
391	592177	592288	592399	592510	592621	592732	592843	592954	593064	593175	111
392	593286	593397	593508	593618	593729	593840	593950	594061	594172	594282	111
393	594393	594503	594614	594724	594834	594945	595055	595165	595276	595386	110
394	595496	595606	595717	595827	595937	596047	596157	596267	596377	596487	110
395	596597	596707	596817	596927	597037	597147	597256	597366	597476	597586	110
396	597695	597805	597915	598024	598134	598243	598353	598462	598572	598681	110
397	598791	598900	599009	599119	599228	599337	599446	599556	599665	599774	109
398	599883	599992	600101	600210	600319	600428	600537	600646	600755	600864	109
399	600973	601082	601191	601299	601408	601517	601626	601734	601843	601951	109
400	602060	602169	602277	602386	602494	602603	602711	602819	602928	603036	108
401	603144	603253	603361	603469	603577	603686	603794	603902	604010	604118	108
402	604226	604334	604442	604550	604658	604766	604874	604982	605090	605197	108
403	605305	605413	605521	605628	605736	605844	605951	606059	606166	606274	108
404	606381	606489	606596	606704	606811	606919	607026	607133	607241	607348	107

First Diff.	SECOND DIFFERENCE.																		First Diff.
	100	90	80	70	60	50	40	30	20	10	9	8	7	6	5	4	3	2	1	
120	83	75	67	58	50	42	33	25	17	08	08	07	06	05	04	03	03	02	01	120
119	84	76	67	59	50	42	34	25	17	08	08	07	06	05	04	03	03	02	01	119
118	85	76	68	59	51	42	34	25	17	08	08	07	06	05	04	03	03	02	01	118
117	85	77	68	60	51	43	34	26	17	09	08	07	06	05	04	03	03	02	01	117
116	86	78	69	60	52	43	35	26	17	09	08	07	06	05	04	03	03	02	01	116
115	87	78	70	61	52	43	35	26	17	09	08	07	06	05	04	03	03	02	01	115
114	88	79	70	61	53	44	35	26	18	09	08	07	06	05	04	04	03	02	01	114
113	88	80	71	62	53	44	35	27	18	09	08	07	06	05	04	04	03	02	01	113
112	89	80	71	62	54	45	36	27	18	09	08	07	06	05	04	04	03	02	01	112
111	90	81	72	63	54	45	36	27	18	09	08	07	06	05	05	04	03	02	01	111
110	91	82	73	64	55	46	36	27	18	09	08	07	06	05	05	04	03	02	01	110
109	92	83	73	64	55	46	37	28	18	09	08	07	06	06	05	04	03	02	01	109
108	93	83	74	65	56	46	37	28	19	09	08	07	07	06	05	04	03	02	01	108
107	93	84	75	65	56	47	37	28	19	09	08	07	07	06	05	04	03	02	01	107

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
405	607455	607562	607669	607777	607884	607991	608098	608205	608312	608419	107
406	608526	608633	608740	608847	608954	609061	609167	609274	609381	609488	107
407	609594	609701	609808	609914	610021	610128	610234	610341	610447	610554	107
408	610660	610767	610873	610979	611086	611192	611298	611405	611511	611617	106
409	611723	611830	611936	612042	612148	612254	612360	612466	612572	612678	106
410	612784	612890	612996	613102	613207	613313	613419	613525	613630	613736	106
411	613842	613948	614053	614159	614264	614370	614475	614581	614686	614792	106
412	614897	615003	615108	615213	615319	615424	615529	615634	615740	615845	105
413	615950	616055	616160	616265	616371	616476	616581	616686	616791	616895	105
414	617000	617105	617210	617315	617420	617525	617629	617734	617839	617943	105
415	618048	618153	618257	618362	618467	618571	618676	618780	618885	618989	105
416	619093	619198	619302	619406	619511	619615	619719	619824	619928	620032	104
417	620136	620240	620344	620448	620552	620656	620760	620864	620968	621072	104
418	621176	621280	621384	621488	621592	621696	621799	621903	622007	622110	104
419	622214	622318	622421	622525	622628	622732	622836	622939	623042	623146	104
420	623249	623353	623456	623559	623663	623766	623869	623973	624076	624179	103
421	624282	624385	624488	624592	624695	624798	624901	625004	625107	625210	103
422	625313	625415	625518	625621	625724	625827	625930	626032	626135	626238	103
423	626340	626443	626546	626648	626751	626853	626956	627059	627161	627263	103
424	627366	627468	627571	627673	627775	627878	627980	628082	628185	628287	102
425	628389	628491	628593	628695	628798	628900	629002	629104	629206	629308	102
426	629410	629512	629613	629715	629817	629919	630021	630123	630224	630326	102
427	630428	630530	630631	630733	630835	630936	631038	631139	631241	631342	102
428	631444	631545	631647	631748	631850	631951	632052	632154	632255	632356	101
429	632457	632559	632660	632761	632862	632963	633064	633165	633266	633367	101
430	633468	633569	633670	633771	633872	633973	634074	634175	634276	634377	101
431	634477	634578	634679	634780	634880	634981	635081	635182	635283	635383	101
432	635484	635584	635685	635785	635886	635986	636087	636187	636287	636388	100
433	636488	636588	636688	636789	636889	636989	637089	637189	637290	637390	100
434	637490	637590	637690	637790	637890	637990	638090	638190	638290	638389	100
435	638489	638589	638689	638789	638888	638988	639088	639188	639287	639387	100
436	639487	639586	639686	639785	639885	639984	640084	640183	640283	640382	99
437	640481	640581	640680	640778	640879	640978	641077	641177	641276	641375	99
438	641474	641573	641672	641772	641871	641970	642069	642168	642267	642366	99
439	642465	642563	642662	642761	642860	642959	643058	643157	643255	643354	99
440	643453	643551	643650	643749	643847	643946	644045	644143	644242	644340	98
441	644439	644537	644636	644734	644832	644931	645029	645127	645226	645324	98
442	645422	645521	645619	645717	645815	645913	646011	646110	646208	646306	98
443	646404	646502	646600	646698	646796	646894	646992	647089	647187	647285	98
444	647383	647481	647579	647676	647774	647872	647970	648067	648165	648262	98
445	648360	648458	648555	648653	648750	648848	648945	649043	649140	649238	97
446	649335	649432	649530	649627	649724	649822	649919	650016	650113	650210	97
447	650308	650405	650502	650599	650696	650793	650890	650987	651084	651181	97
448	651278	651375	651472	651569	651666	651762	651859	651956	652053	652150	97
449	652246	652343	652440	652536	652633	652730	652826	652923	653020	653116	97

First Diff.	SECOND DIFFERENCE.																		First Diff.
	100	90	80	70	60	50	40	30	20	10	9	8	7	6	5	4	3	2	1	
107	93	84	75	65	56	47	37	28	19	09	08	07	07	06	05	04	03	02	01	107
106	94	85	75	66	57	47	38	28	19	09	08	08	07	06	05	04	03	02	01	106
105	95	86	76	67	57	48	38	29	19	10	09	08	07	06	05	04	03	02	01	105
104	96	86	77	67	58	48	38	29	19	10	09	08	07	06	05	04	03	02	01	104
103	97	87	77	68	58	48	39	29	19	10	09	08	07	06	05	04	03	02	01	103
102	98	88	78	69	59	49	39	29	20	10	09	08	07	06	05	04	03	02	01	102
101	99	89	79	69	59	49	40	30	20	10	09	08	07	06	05	04	03	02	01	101
100	100	90	80	70	60	50	40	30	20	10	09	08	07	06	05	04	03	02	01	100
99		91	81	71	61	51	40	30	20	10	09	08	07	06	05	04	03	02	01	99
98		92	81	71	61	51	41	31	20	10	09	08	07	06	05	04	03	02	01	98
97		93	82	72	62	52	41	31	21	10	09	08	07	06	05	04	03	02	01	97

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
450	653213	653309	653406	653502	653598	653695	653791	653888	653984	654080	96
451	654177	654273	654369	654465	654562	654658	654754	654850	654946	655042	96
452	655138	655235	655331	655427	655523	655619	655715	655811	655906	656002	96
453	656098	656194	656290	656386	656482	656577	656673	656769	656865	656960	96
454	657056	657152	657247	657343	657438	657534	657629	657725	657821	657916	96
455	658011	658107	658202	658298	658393	658488	658584	658679	658774	658870	95
456	658965	659060	659155	659251	659346	659441	659536	659631	659726	659821	95
457	659916	660011	660106	660201	660296	660391	660486	660581	660676	66077*	95
458	660866	660960	661055	661150	661245	661339	661434	661529	661623	661718	95
459	661813	661907	662002	662096	662191	662286	662380	662475	662569	662663	95
460	662758	662852	662947	663041	663135	663230	663324	663418	663513	663607	94
461	663701	663795	663889	663984	664078	664172	664266	664360	664454	664548	94
462	664642	664736	664830	664924	665018	665112	665206	665300	665393	665487	94
463	665581	665675	665769	665862	665956	666050	666143	666237	666331	666424	94
464	666518	666612	666705	666799	666892	666986	667079	667173	667266	667360	94
465	667453	667546	667640	667733	667826	667920	668013	668106	668200	668293	93
466	668386	668479	668572	668665	668759	668852	668945	669038	669131	669224	93
467	669317	669410	669503	669596	669689	669782	669875	669967	670060	670153	93
468	670246	670339	670431	670524	670617	670710	670802	670895	670988	671080	93
469	671173	671265	671358	671451	671543	671636	671728	671821	671913	672005	93
470	672098	672190	672283	672375	672467	672560	672652	672744	672837	672929	92
471	673021	673113	673205	673297	673390	673482	673574	673666	673758	673850	92
472	673942	674034	674126	674218	674310	674402	674494	674586	674678	674769	92
473	674861	674953	675045	675137	675228	675320	675412	675503	675595	675687	92
474	675778	675870	675962	676053	676145	676236	676328	676419	676511	676602	92
475	676694	676785	676876	676968	677059	677151	677242	677333	677424	677516	91
476	677607	677698	677789	677881	677972	678063	678154	678245	678336	678427	91
477	678518	678609	678700	678791	678882	678973	679064	679155	679246	679337	91
478	679428	679519	679610	679700	679791	679882	679973	680063	680154	680245	91
479	680336	680426	680517	680607	680698	680789	680879	680970	681060	681151	91
480	681241	681332	681422	681513	681603	681693	681784	681874	681965	682055	90
481	682145	682235	682326	682416	682506	682596	682687	682777	682867	682957	90
482	683047	683137	683227	683317	683407	683497	683587	683677	683767	683857	90
483	683947	684037	684127	684217	684307	684397	684486	684576	684666	684756	90
484	684845	684935	685025	685115	685204	685294	685383	685473	685563	685652	90
485	685742	685831	685921	686010	686100	686189	686279	686368	686458	686547	89
486	686636	686726	686815	686904	686994	687083	687172	687261	687351	687440	89
487	687529	687618	687707	687796	687886	687975	688064	688153	688242	688331	89
488	688420	688509	688598	688687	688776	688865	688954	689042	689131	689220	89
489	689309	689398	689486	689575	689664	689753	689841	689930	690019	690107	89
490	690196	690285	690373	690462	690551	690639	690728	690816	690905	690993	89
491	691082	691170	691258	691347	691435	691524	691612	691700	691789	691877	88
492	691965	692053	692142	692230	692318	692406	692494	692583	692671	692759	88
493	692847	692935	693023	693111	693199	693287	693375	693463	693551	693640	88
494	693727	693815	693903	693991	694079	694166	694254	694342	694430	694518	88
495	694605	694693	694781	694868	694956	695044	695131	695219	695307	695394	88
496	695482	695569	695657	695744	695832	695919	696007	696094	696182	696269	87
497	696356	696441	696531	696619	696706	696793	696880	696968	697055	697142	87
498	697229	697317	697404	697491	697578	697665	697752	697839	697926	698014	87
499	698101	698188	698275	698362	698449	698536	698622	698709	698796	698883	87

First Diff.	SECOND DIFFERENCE.																	First Diff.
	90	80	70	60	50	40	30	20	10	9	8	7	6	5	4	3	2	1	
96	94	83	73	63	52	42	31	20	10	09	08	07	06	05	04	03	02	01	96
95	95	84	74	63	53	42	32	21	11	09	08	07	06	05	04	03	02	01	95
94	96	85	75	64	53	43	32	21	11	10	09	07	06	05	04	03	02	01	94
93	97	86	75	65	54	43	32	22	11	10	09	07	06	05	04	03	02	01	93
92	98	87	76	65	54	44	33	22	11	10	09	08	07	05	04	03	02	01	92
91	99	88	77	66	55	44	33	22	11	10	09	08	07	05	04	03	02	01	91
90	100	89	78	67	56	45	33	22	11	10	09	08	07	06	04	03	02	01	90
89		90	79	68	56	45	34	23	11	10	09	08	07	06	05	03	02	01	89
88		91	80	68	57	46	34	23	11	10	09	08	07	06	05	03	02	01	88
87		92	81	69	58	46	35	23	12	10	09	08	07	06	05	03	02	01	87

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
500	698970	699057	699144	699231	699317	699404	699491	699578	699664	699751	87
501	699838	699924	700011	700098	700184	700271	700358	700444	700531	700617	87
502	700704	700790	700877	700963	701050	701136	701223	701309	701395	701482	86
503	701568	701654	701741	701827	701913	702000	702086	702172	702258	702344	86
504	702431	702517	702603	702689	702775	702861	702947	703033	703119	703205	86
505	703291	703377	703463	703549	703635	703721	703807	703893	703979	704065	86
506	704151	704236	704322	704408	704494	704579	704665	704751	704837	704922	86
507	705008	705094	705179	705265	705351	705436	705522	705607	705693	705778	86
508	705864	705949	706035	706120	706206	706291	706376	706462	706547	706633	85
509	706718	706803	706888	706974	707059	707144	707229	707315	707400	707485	85
510	707570	707655	707741	707826	707911	707996	708081	708166	708251	708336	85
511	708421	708506	708591	708676	708761	708846	708931	709015	709100	709185	85
512	709270	709355	709440	709524	709609	709694	709779	709863	709948	710033	85
513	710117	710202	710287	710371	710456	710540	710625	710710	710794	710879	85
514	710963	711048	711132	711217	711301	711385	711470	711554	711639	711723	84
515	711807	711892	711976	712060	712144	712229	712313	712397	712481	712566	84
516	712650	712734	712818	712902	712986	713070	713154	713239	713323	713407	84
517	713491	713575	713659	713743	713826	713910	713994	714078	714162	714246	84
518	714330	714414	714497	714581	714665	714749	714833	714916	715000	715084	84
519	715167	715251	715335	715418	715502	715586	715669	715753	715836	715920	84
520	716003	716087	716170	716254	716337	716421	716504	716588	716671	716754	83
521	716838	716921	717004	717088	717171	717254	717338	717421	717504	717587	83
522	717671	717754	717837	717920	718003	718086	718169	718253	718336	718419	83
523	718502	718585	718668	718751	718834	718917	719000	719083	719166	719248	83
524	719331	719414	719497	719580	719663	719746	719828	719911	719994	720077	83
525	720159	720242	720325	720407	720490	720573	720655	720738	720821	720903	83
526	720986	721068	721151	721233	721316	721398	721481	721563	721646	721728	82
527	721811	721893	721975	722058	722140	722223	722305	722387	722469	722552	82
528	722634	722716	722798	722881	722963	723045	723127	723209	723291	723374	82
529	723456	723538	723620	723702	723784	723866	723948	724030	724112	724194	82
530	724276	724358	724440	724522	724604	724685	724767	724849	724931	725013	82
531	725095	725176	725258	725340	725422	725503	725585	725667	725748	725830	82
532	725912	725993	726075	726157	726238	726320	726401	726483	726564	726646	82
533	726727	726809	726890	726972	727053	727134	727216	727297	727379	727460	81
534	727541	727623	727704	727785	727866	727948	728029	728110	728191	728273	81
535	728354	728435	728516	728597	728678	728760	728841	728922	729003	729084	81
536	729165	729246	729327	729408	729489	729570	729651	729732	729813	729893	81
537	729974	730055	730136	730217	730298	730379	730459	730540	730621	730702	81
538	730782	730863	730944	731024	731105	731186	731266	731347	731428	731508	81
539	731589	731669	731750	731830	731911	731991	732072	732152	732233	732313	81
540	732394	732474	732555	732635	732715	732796	732876	732956	733037	733117	80
541	733197	733278	733358	733438	733518	733599	733679	733759	733839	733919	80
542	733999	734079	734160	734240	734320	734400	734480	734560	734640	734720	80
543	734800	734880	734960	735040	735120	735200	735279	735359	735439	735519	80
544	735599	735679	735759	735838	735918	735998	736078	736157	736237	736317	80
545	736397	736476	736556	736636	736715	736795	736874	736954	737034	737113	80
546	737193	737272	737352	737431	737511	737590	737670	737749	737829	737908	79
547	737987	738067	738146	738225	738305	738384	738463	738543	738622	738701	79
548	738781	738860	738939	739018	739097	739177	739256	739335	739414	739493	79
549	739572	739651	739731	739810	739889	739968	740047	740126	740205	740284	79

First Diff.	SECOND DIFFERENCE.																First Diff.
	80	70	60	50	40	30	20	10	9	8	7	6	5	4	3	2	1	
87	92	81	69	58	46	35	23	12	10	09	08	07	06	05	03	02	01	87
86	93	81	70	58	47	35	23	12	10	09	08	07	06	05	03	02	01	86
85	94	82	71	59	47	35	24	12	11	09	08	07	06	05	04	02	01	85
84	95	83	72	60	48	36	24	12	11	10	08	07	06	05	04	02	01	84
83	96	84	72	60	48	36	24	12	11	10	08	07	06	05	04	02	01	83
82	98	85	73	61	49	37	24	12	11	10	09	07	06	05	04	02	01	82
81	99	86	74	62	49	37	25	12	11	10	09	07	06	05	04	02	01	81
80	100	88	75	63	50	38	25	13	11	10	09	08	06	05	04	03	01	80
79		89	76	63	51	38	25	13	11	10	09	08	06	05	04	03	01	79

TABLE XXIV.

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
550	740363	740442	740521	740600	740678	740757	740836	740915	740994	741073	79
551	741152	741230	741309	741388	741467	741546	741624	741703	741782	741860	79
552	741939	742018	742096	742175	742254	742332	742411	742490	742568	742647	79
553	742725	742804	742882	742961	743039	743118	743196	743275	743353	743431	78
554	743510	743588	743667	743745	743823	743902	743980	744058	744137	744215	78
555	744293	744371	744450	744528	744606	744684	744762	744840	744919	744997	78
556	745075	745153	745231	745309	745387	745465	745543	745621	745699	745777	78
557	745855	745933	746011	746089	746167	746245	746323	746401	746479	746556	78
558	746634	746712	746790	746868	746945	747023	747101	747179	747256	747334	78
559	747412	747490	747567	747645	747723	747800	747878	747955	748033	748111	78
560	748188	748266	748343	748421	748498	748576	748653	748731	748808	748885	77
561	748963	749040	749118	749195	749272	749350	749427	749504	749582	749659	77
562	749736	749814	749891	749968	750045	750123	750200	750277	750354	750431	77
563	750508	750586	750663	750740	750817	750894	750971	751048	751125	751202	77
564	751279	751356	751433	751510	751587	751664	751741	751818	751895	751972	77
565	752048	752125	752202	752279	752356	752433	752509	752586	752663	752740	77
566	752816	752893	752970	753047	753123	753200	753277	753353	753430	753507	77
567	753583	753660	753736	753813	753889	753966	754042	754119	754195	754272	77
568	754348	754425	754501	754578	754654	754731	754807	754883	754960	755036	76
569	755112	755189	755265	755341	755418	755494	755570	755646	755722	755799	76
570	755875	755951	756027	756103	756180	756256	756332	756408	756484	756560	76
571	756636	756712	756788	756864	756940	757016	757092	757168	757244	757320	76
572	757396	757472	757548	757624	757700	757776	757851	757927	758003	758079	76
573	758155	758230	758306	758382	758458	758533	758609	758685	758761	758836	76
574	758912	758988	759063	759139	759214	759290	759366	759441	759517	759592	76
575	759668	759743	759819	759894	759970	760045	760121	760196	760272	760347	75
576	760423	760498	760573	760649	760724	760799	760875	760950	761025	761101	75
577	761176	761251	761326	761402	761477	761552	761627	761702	761778	761853	75
578	761928	762003	762078	762153	762228	762303	762378	762454	762529	762604	75
579	762679	762754	762829	762904	762979	763053	763128	763203	763278	763353	75
580	763428	763503	763578	763653	763727	763802	763877	763952	764027	764101	75
581	764176	764251	764326	764400	764475	764550	764624	764699	764774	764848	75
582	764923	764998	765072	765147	765221	765296	765371	765445	765520	765594	75
583	765669	765743	765818	765892	765966	766041	766115	766190	766264	766339	74
584	766413	766487	766562	766636	766710	766785	766859	766933	767007	767082	74
585	767156	767230	767304	767379	767453	767527	767601	767675	767749	767824	74
586	767898	767972	768046	768120	768194	768268	768342	768416	768490	768564	74
587	768638	768712	768786	768860	768934	769008	769082	769156	769230	769304	74
588	769377	769451	769525	769599	769673	769747	769820	769894	769968	770042	74
589	770115	770189	770263	770336	770410	770484	770558	770631	770705	770778	74
590	770852	770926	770999	771073	771146	771220	771293	771367	771441	771511	74
591	771588	771661	771734	771808	771881	771955	772028	772102	772175	772248	73
592	772322	772395	772468	772542	772615	772688	772762	772835	772908	772981	73
593	773055	773128	773201	773274	773348	773421	773494	773567	773640	773713	73
594	773786	773860	773933	774006	774079	774152	774225	774298	774371	774444	73
595	774517	774590	774663	774736	774809	774882	774955	775028	775101	775173	73
596	775246	775319	775392	775465	775538	775610	775683	775756	775829	775902	73
597	775974	776047	776120	776193	776265	776338	776411	776483	776556	776629	73
598	776701	776774	776846	776919	776992	777064	777137	777209	777282	777354	73
599	777427	777499	777572	777644	777717	777789	777862	777934	778007	778079	73

First Diff.	SECOND DIFFERENCE.																						First Diff.
	70	60	50	40	30	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
79	89	76	63	51	38	25	24	23	22	20	19	18	16	15	14	13	11	10	9	8	6	5	4	3	1	79
78	90	77	64	51	39	26	24	23	22	21	19	18	17	15	14	13	12	10	9	8	6	5	4	3	1	78
77	91	78	65	52	39	26	25	23	22	21	20	18	17	16	14	13	12	10	9	8	6	5	4	3	1	77
76	92	79	66	53	40	26	25	24	22	21	20	18	17	16	14	13	12	11	9	8	7	5	4	3	1	76
75	93	80	67	53	40	27	25	24	23	21	20	19	17	16	15	13	12	11	9	8	7	5	4	3	1	75
74	95	81	68	54	41	27	26	24	23	22	20	19	18	16	15	14	12	11	9	8	7	5	4	3	1	74
73	96	82	68	55	41	27	26	25	23	22	21	19	18	16	15	14	12	11	10	8	7	5	4	3	1	73

TABLE XXIV.

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
600	778151	778224	778296	778368	778441	778513	778585	778658	778730	778802	72
601	778875	778947	779019	779091	779163	779236	779308	779380	779452	779524	72
602	779597	779669	779741	779813	779885	779957	780029	780101	780173	780245	72
603	780317	780389	780461	780533	780605	780677	780749	780821	780893	780965	72
604	781037	781109	781181	781253	781325	781396	781468	781540	781612	781684	72
605	781755	781827	781899	781971	782042	782114	782186	782258	782329	782401	72
606	782473	782544	782616	782688	782759	782831	782902	782974	783046	783117	72
607	783189	783260	783332	783403	783475	783546	783618	783689	783761	783832	71
608	783901	783975	784046	784118	784189	784261	784332	784403	784475	784546	71
609	784617	784689	784760	784831	784902	784974	785045	785116	785187	785259	71
610	785330	785401	785472	785543	785615	785686	785757	785828	785899	785970	71
611	786041	786112	786183	786254	786325	786397	786468	786539	786610	786680	71
612	786751	786822	786893	786964	787035	787106	787177	787248	787319	787390	71
613	787461	787531	787602	787673	787744	787815	787885	787956	788027	788098	71
614	788168	788239	788310	788381	788451	788522	788593	788663	788734	788805	71
615	788875	788946	789016	789087	789158	789228	789299	789369	789440	789510	71
616	789581	789651	789722	789792	789863	789933	790004	790074	790144	790215	70
617	790285	790356	790426	790496	790567	790637	790707	790778	790848	790918	70
618	790989	791059	791129	791199	791270	791340	791410	791480	791550	791621	70
619	791691	791761	791831	791901	791971	792041	792111	792182	792252	792322	70
620	792392	792462	792532	792602	792672	792742	792812	792882	792952	793022	70
621	793092	793162	793231	793301	793371	793441	793511	793581	793651	793721	70
622	793790	793860	793930	794000	794070	794139	794209	794279	794349	794418	70
623	794488	794558	794627	794697	794767	794836	794906	794976	795045	795115	70
624	795185	795254	795324	795393	795463	795532	795602	795672	795741	295811	70
625	795880	795950	796019	796088	796158	796227	796297	796366	796436	796505	69
626	796574	796644	796713	796782	796852	796921	796990	797060	797129	797198	69
627	797268	797337	797406	797475	797545	797614	797683	797752	797821	797891	69
628	797960	798029	798098	798167	798236	798305	798374	798444	798513	798582	69
629	798651	798720	798789	798858	798927	798996	799065	799134	799203	799272	69
630	799341	799410	799478	799547	799616	799685	799754	799823	799892	799961	69
631	800029	800098	800167	800236	800305	800373	800442	800511	800580	800648	69
632	800717	800786	800855	800923	800992	801061	801129	801198	801267	801335	69
633	801404	801472	801541	801610	801678	801747	801815	801884	801952	802021	69
634	802089	802158	802226	802295	802363	802432	802500	802569	802637	802705	68
635	802774	802842	802911	802979	803047	803116	803184	803252	803321	803389	68
636	803457	803525	803594	803662	803730	803798	803867	803935	804003	804071	68
637	804139	804208	804276	804344	804412	804480	804548	804616	804685	804753	68
638	804821	804889	804957	805025	805093	805161	805229	805297	805365	805433	68
639	805501	805569	805637	805705	805773	805841	805909	805976	806044	806112	68
640	806180	806248	806316	806384	806451	806519	806587	806655	806723	806790	68
641	806858	806926	806994	807061	807129	807197	807264	807332	807400	807467	68
642	807535	807603	807670	807738	807806	807873	807941	808008	808076	808143	68
643	808211	808279	808346	808414	808481	808549	808616	808684	808751	808818	68
644	808886	808953	809021	809088	809156	809223	809290	809358	809425	809492	67
645	809560	809627	809694	809762	809829	809896	809964	810031	810098	810165	67
646	810233	810300	810367	810434	810501	810569	810636	810703	810770	810837	67
647	810904	810971	811039	811106	811173	811240	611307	811374	811441	811508	67
648	811575	811642	811709	811776	811843	811910	811977	812044	812111	812178	67
649	812245	812312	812379	812445	812512	812579	812646	812713	812780	812847	67

First Diff.	SECOND DIFFERENCE.																							First Diff.
	70	60	50	40	30	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
72	97	83	69	56	42	28	26	25	24	22	21	19	18	17	15	14	13	11	10	8	7	6	4	3	1	72
71	99	85	70	56	42	28	27	25	24	23	21	20	18	17	15	14	13	11	10	8	7	6	4	3	1	71
70	100	86	71	57	43	29	27	26	24	23	21	20	19	17	16	14	13	11	10	9	7	6	4	3	1	70
69		87	72	58	43	29	28	26	25	23	22	20	19	17	16	14	13	12	10	9	7	6	4	3	1	69
68		88	74	59	44	29	28	27	25	24	22	21	19	18	16	15	13	12	10	9	7	6	4	3	1	68
67		90	75	60	45	30	28	27	25	24	22	21	19	18	16	15	13	12	10	9	7	6	4	3	1	67

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
650	812913	812980	813047	813114	813181	813247	813314	813381	813448	813514	67
651	813581	813648	813714	813781	813848	813914	813981	814048	814114	814181	67
652	814248	814314	814381	814447	814514	814581	814647	814714	814780	814847	67
653	814913	814980	815046	815113	815179	815246	815312	815379	815445	815511	66
654	815578	815644	815711	815777	815843	815910	815976	816042	816109	816175	66
655	816241	816308	816374	816440	816506	816573	816639	816705	816771	816838	66
656	816904	816970	817036	817102	817169	817235	817301	817367	817433	817499	66
657	817565	817632	817698	817764	817830	817896	817962	818028	818094	818160	66
658	818226	818292	818358	818424	818490	818556	818622	818688	818754	818820	66
659	818885	818951	819017	819083	819149	819215	819281	819347	819412	819478	66
660	819544	819610	819676	819741	819807	819873	819939	820004	820070	820136	66
661	820202	820267	820333	820399	820464	820530	820596	820661	820727	820792	66
662	820858	820924	820989	821055	821120	821186	821251	821317	821383	821448	66
663	821514	821579	821645	821710	821776	821841	821906	821972	822037	822103	66
664	822168	822234	822299	822364	822430	822495	822560	822626	822691	822756	65
665	822822	822887	822952	823018	823083	823148	823213	823279	823344	823409	65
666	823474	823539	823605	823670	823735	823800	823865	823931	823996	824061	65
667	824126	824191	824256	824321	824386	824451	824516	824581	824646	824711	65
668	824777	824842	824907	824972	825036	825101	825166	825231	825296	825361	65
669	825426	825491	825556	825621	825686	825751	825815	825880	825945	826010	65
670	826075	826140	826204	826269	826334	826399	826464	826528	826593	826658	65
671	826723	826787	826852	826917	826981	827046	827111	827175	827240	827305	65
672	827369	827434	827499	827563	827628	827692	827757	827821	827886	827951	65
673	828015	828080	828144	828209	828273	828338	828402	828467	828531	828596	64
674	828660	828724	828789	828853	828918	828982	829046	829111	829175	829239	64
675	829304	829368	829432	829497	829561	829625	829690	829754	829818	829882	64
676	829947	830011	830075	830139	830204	830268	830332	830396	830460	830525	64
677	830589	830653	830717	830781	830845	830909	830973	831038	831102	831166	64
678	831230	831294	831358	831422	831486	831550	831614	831678	831742	831806	64
679	831870	831934	831998	832062	832126	832190	832253	832317	832381	832445	64
680	832509	832573	832637	832701	832764	832828	832892	832956	833020	833083	64
681	833147	833211	833275	833338	833402	833466	833530	833593	833657	833721	64
682	833784	833848	833912	833975	834039	834103	834166	834230	834294	834357	64
683	834421	834484	834548	834611	834675	834739	834802	834866	834929	834993	64
684	835056	835120	835183	835247	835310	835374	835437	835500	835564	835627	63
685	835691	835754	835817	835881	835944	836008	836071	836134	836198	836261	63
686	836324	836387	836451	836514	836577	836641	836704	836767	836830	836894	63
687	836957	837020	837083	837146	837210	837273	837336	837399	837462	837525	63
688	837588	837652	837715	837778	837841	837904	837967	838030	838093	838156	63
689	838219	838282	838345	838408	838471	838534	838597	838660	838723	838786	63
690	838849	838912	838975	839038	839101	839164	839227	839290	839352	839415	63
691	839478	839541	839604	839667	839729	839792	839855	839918	839981	840043	63
692	840106	840169	840232	840294	840357	840420	840483	840545	840608	840671	63
693	840733	840796	840859	840921	840984	841047	841109	841172	841234	841297	63
694	841360	841422	841485	841547	841610	841672	841735	841797	841860	841922	63
695	841985	842047	842110	842172	842235	842297	842360	842422	842484	842547	62
696	842609	842672	842734	842796	842859	842921	842984	843046	843108	843171	62
697	843233	843295	843357	843420	843482	843544	843607	843669	843731	843793	62
698	843855	843918	843980	844042	844104	844166	844229	844291	844353	844415	62
699	844477	844539	844601	844664	844726	844788	844850	844912	844974	845036	62

First Diff.	SECOND DIFFERENCE.																						First Diff.
	60	50	40	30	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
67	90	75	60	45	30	28	27	25	24	22	21	19	18	16	15	13	12	10	9	7	6	4	3	1	67
66	91	76	61	45	30	29	27	26	24	23	21	20	18	17	15	14	12	11	9	8	6	5	3	2	66
65	92	77	62	46	31	29	28	26	25	23	22	20	18	17	15	14	12	11	9	8	6	5	3	2	65
64	94	78	62	47	31	30	28	27	25	23	22	20	18	17	16	14	12	11	9	8	6	5	3	2	64
63	95	79	63	48	32	30	29	27	25	24	22	21	19	17	16	14	13	11	10	8	6	5	3	2	63
62	97	81	64	48	32	31	29	27	26	24	23	21	19	18	16	15	13	11	10	8	6	5	3	2	62

TABLE XXIV.

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
700	845098	845160	845222	845284	845346	845408	845470	845532	845594	845656	62
701	845718	845780	845842	845904	845966	846028	846090	846152	846213	846275	62
702	846337	846399	846461	846523	846585	846646	846708	846770	846832	846894	62
703	846955	847017	847079	847141	847202	847264	847326	847388	847449	847511	62
704	847573	847634	847696	847758	847819	847881	847943	848004	848066	848128	62
705	848189	848251	848312	848374	848436	848497	848559	848620	848682	848743	62
706	848805	848866	848928	848989	849051	849112	849174	849235	849297	849358	61
707	849419	849481	849542	849604	849665	849726	849788	849849	849911	849972	61
708	850033	850095	850156	850217	850279	850340	850401	850462	850524	850585	61
709	850646	850708	850769	850830	850891	850952	851014	851075	851136	851197	61
710	851258	851320	851381	851442	851503	851564	851625	851686	851747	851809	61
711	851870	851931	851992	852053	852114	852175	852236	852297	852358	852419	61
712	852480	852541	852602	852663	852724	852785	852846	852907	852968	853029	61
713	853090	853150	853211	853272	853333	853394	853455	853516	853577	853637	61
714	853698	853759	853820	853881	853941	854002	854063	854124	854185	854245	61
715	854306	854367	854428	854488	854549	854610	854670	854731	854792	854852	61
716	854913	854974	855034	855095	855156	855216	855277	855337	855398	855459	61
717	855519	855580	855640	855701	855761	855822	855882	855943	856003	856064	61
718	856124	856185	856245	856306	856366	856427	856487	856548	856608	856669	60
719	856729	856789	856850	856910	856970	857031	857091	857152	857212	857272	60
720	857333	857393	857453	857513	857574	857634	857694	857755	857815	857875	60
721	857935	857996	858056	858116	858176	858236	858297	858357	858417	858477	60
722	858537	858597	858658	858718	858778	858838	858898	858958	859018	859078	60
723	859138	859198	859258	859319	859379	859439	859499	859559	859619	859679	60
724	859739	859799	859859	859919	859978	860038	860098	860158	860218	860278	60
725	860338	860398	860458	860518	860578	860637	860697	860757	860817	860877	60
726	860937	860996	861056	861116	861176	861236	861295	861355	861415	861475	60
727	861534	861594	861654	861714	861773	861833	861893	861952	862012	862072	60
728	862131	862191	862251	862310	862370	862430	862489	862549	862608	862668	60
729	862728	862787	862847	862906	862966	863025	863085	863144	863204	863263	60
730	863323	863382	863442	863501	863561	863620	863680	863739	863799	863858	59
731	863917	863977	864036	864096	864155	864214	864274	864333	864392	864452	59
732	864511	864570	864630	864689	864748	864808	864867	864926	864986	865045	59
733	865104	865163	865223	865282	865341	865400	865459	865519	865578	865637	59
734	865696	865755	865814	865874	865933	865992	866051	866110	866169	866228	59
735	866287	866346	866406	866465	866524	866583	866642	866701	866760	866819	59
736	866878	866937	866996	867055	867114	867173	867232	867291	867350	867409	59
737	867468	867526	867585	867644	867703	867762	867821	867880	867939	867998	59
738	868056	868115	868174	868233	868292	868351	868409	868468	868527	868586	59
739	868644	868703	868762	868821	868879	868938	868997	869056	869114	869173	59
740	869232	869290	869349	869408	869466	869525	869584	869642	869701	869760	59
741	869818	869877	869935	869994	870053	870111	870170	870228	870287	870345	59
742	870404	870462	870521	870579	870638	870697	870755	870813	870872	870930	58
743	870989	851047	871106	871164	871223	871281	871339	871398	871456	871515	58
744	871573	871631	871690	871748	871806	871865	871923	871981	872040	872098	58
745	872156	872215	872273	872331	872389	872448	872506	872564	872622	872681	58
746	872739	872797	872855	872913	872972	873030	873088	873146	873204	873263	58
747	873321	873379	873437	873495	873553	873611	873669	873727	873786	873844	58
748	873902	873960	874018	874076	874134	874192	874250	874308	874366	874424	58
749	874482	874540	874598	874656	874714	874772	874830	874888	874945	875003	58

First Diff.	SECOND DIFFERENCE.																						First Diff.
	60	50	40	30	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
62	97	81	64	48	32	31	29	27	26	24	23	21	19	18	16	15	13	11	10	8	6	5	3	2	62
61	98	82	65	49	33	31	30	28	26	25	23	21	20	18	16	15	13	11	10	8	7	5	3	2	61
60	100	83	67	50	33	32	30	28	27	25	23	22	20	18	17	15	13	12	10	8	7	5	3	2	60
59		85	68	51	34	32	31	29	27	25	24	22	20	19	17	15	14	12	10	8	7	5	3	2	59
58		86	69	52	35	33	31	29	28	26	24	22	21	19	17	16	14	12	10	9	7	5	3	2	58

TABLE XXIV.

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
750	875061	875119	875177	875235	875293	875351	875409	875466	875524	875582	58
751	875640	875698	875756	875813	875871	875929	875987	876045	876102	876160	58
752	876218	876276	876333	876391	876449	876507	876564	876622	876680	876737	58
753	876795	876853	876910	876968	877026	877083	877141	877199	877256	877314	58
754	877371	877429	877487	877544	877602	877659	877717	877774	877832	877889	58
755	877947	878005	878062	878120	878177	878235	878292	878349	878407	878464	57
756	878522	878579	878637	878694	878752	878809	878866	878924	878981	879039	57
757	879096	879153	879211	879268	879325	879383	879440	879497	879555	879612	57
758	879669	879727	879784	879841	879898	879956	880013	880070	880127	880185	57
759	880242	880299	880356	880413	880471	880528	880585	880642	880699	880756	57
760	880814	880871	880928	880985	881042	881099	881156	881213	881271	881328	57
761	881385	881442	881499	881556	881613	881670	881727	881784	881841	881898	57
762	881955	882012	882069	882126	882183	882240	882297	882354	882411	882468	57
763	882525	882582	882638	882695	882752	882809	882866	882923	882980	883037	57
764	883093	883150	883207	883264	883321	883378	883434	883491	883548	883605	57
765	883661	883718	883775	883832	883889	883945	884002	884059	884115	884172	57
766	884229	884286	884342	884399	884456	884512	884569	884626	884682	884739	57
767	884795	884852	884909	884965	885022	885078	885135	885192	885248	885305	57
768	885361	885418	885474	885531	885587	885644	885700	885757	885813	885870	57
769	885926	885983	886039	886096	886152	886209	886265	886322	886378	886434	56
770	886491	886547	886604	886660	886716	886773	886829	886885	886942	886998	56
771	887054	887111	887167	887223	887280	887336	887392	887449	887505	887561	56
772	887617	887674	887730	887786	887842	887899	887955	888011	888067	888123	56
773	888180	888236	888292	888348	888404	888460	888517	888573	888629	888685	56
774	888741	888797	888853	888909	888965	889021	889078	889134	889190	889246	56
775	889302	889358	889414	889470	889526	889582	889638	889694	889750	889806	56
776	889862	889918	889974	890030	890086	890142	890197	890253	890309	890365	56
777	890421	890477	890533	890589	890645	890700	890756	890812	890868	890924	56
778	890980	891035	891091	891147	891203	891259	891314	891370	891426	891482	56
779	891538	891593	891649	891705	891760	891816	891872	891928	891983	892039	56
780	892095	892150	892206	892262	892317	892373	892429	892484	892540	892595	56
781	892651	892707	892762	892818	892873	892929	892985	893040	893096	893151	56
782	893207	893262	893318	893373	893429	893484	893540	893595	893651	893706	56
783	893762	893817	893873	893928	893984	894039	894094	894151	894205	894261	55
784	894316	894372	894427	894482	894538	894593	894648	894704	894759	894814	55
785	894870	894925	894980	895036	895091	895146	895202	895257	895312	895367	55
786	895423	895478	895533	895588	895644	895699	895754	895809	895864	895920	55
787	895975	896030	896085	896140	896195	896251	896306	896361	896416	896471	55
788	896526	896581	896636	896692	896747	896802	896857	896912	896967	897022	55
789	897077	897132	897187	897242	897297	897352	897407	897462	897517	897572	55
790	897627	897682	897737	897792	897847	897902	897957	898012	898067	898122	55
791	898177	898231	898286	898341	898396	898451	898506	898561	898616	898670	55
792	898725	898780	898835	898890	898945	898999	899054	899109	899164	899218	55
793	899273	899328	899383	899438	899492	899547	899602	899656	899711	899766	55
794	899821	899875	899930	899985	900039	900094	900149	900203	900258	900313	55
795	900367	900422	900476	900531	900586	900640	900695	900749	900804	900859	55
796	900913	900968	901022	901077	901131	901186	901240	901295	901349	901404	55
797	901458	901513	901567	901622	901676	901731	901785	901840	901894	901949	54
798	902003	902057	902112	902166	902221	902275	902329	902384	902438	902492	54
799	902547	902601	902656	902710	902764	902819	902873	902927	902981	903036	54

First Diff.	SECOND DIFFERENCE.																				First Diff.
	50	40	30	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
58	86	69	52	35	33	31	29	28	26	24	22	21	19	17	16	14	12	10	9	7	5	3	2	58
57	88	70	53	35	33	32	30	28	26	25	23	21	19	18	16	14	12	11	9	7	5	4	2	57
56	89	71	54	36	34	32	30	29	27	25	23	21	20	18	16	14	12	11	9	7	5	4	2	56
55	91	73	55	36	35	33	31	29	27	25	24	22	20	18	16	15	13	11	9	7	5	4	2	55
54	93	74	56	37	35	33	31	30	28	26	24	22	20	19	17	15	13	11	9	7	6	4	2	54

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
800	903090	903141	903199	903253	903307	903361	903416	903470	903524	903578	54
801	903633	903687	903741	903795	903849	903904	903958	904012	904066	904120	54
802	904174	904229	904283	904337	904391	904445	904499	904553	904607	904662	54
803	904716	904770	904824	904878	904932	904986	905040	905094	905148	905202	54
804	905256	905310	905364	905418	905472	905526	905580	905634	905688	905742	54
805	905796	905850	905904	905958	906012	906066	906120	906173	906227	906281	54
806	906335	906389	906443	906497	906551	906604	906658	906712	906766	906820	54
807	906874	906927	906981	907035	907089	907143	907196	907250	907304	907358	54
808	907411	907465	907519	907573	907626	907680	907734	907787	907841	907895	54
809	907949	908002	908056	908110	908163	908217	908271	908324	908378	908431	54
810	908485	908539	908592	908646	908699	908753	908807	908860	908914	908967	54
811	909021	909074	909128	909182	909235	909289	909342	909396	909449	909503	54
812	909556	909610	909663	909717	909770	909823	909877	909930	909984	910037	53
813	910091	910144	910197	910251	910304	910358	910411	910464	910518	910571	53
814	910624	910678	910731	910784	910838	910891	910944	910998	911051	911104	53
815	911158	911211	911264	911317	911371	911424	911477	911531	911584	911637	53
816	911690	911743	911797	911850	911903	911956	912009	912063	912116	912169	53
817	912222	912275	912328	912382	912435	912488	912541	912594	912647	912700	53
818	912753	912806	912860	912913	912966	913019	913072	913125	913178	913231	53
819	913284	913337	913390	913443	913496	913549	913602	913655	913708	913761	53
820	913814	913867	913920	913973	914026	914079	914132	914184	914237	914290	53
821	914343	914396	914449	914502	914555	914608	914660	914713	914766	914819	53
822	914872	914925	914978	915030	915083	915136	915189	915242	915294	915347	53
823	915400	915453	915505	915558	915611	915664	915716	915769	915822	915875	53
824	915927	915980	916033	916085	916138	916191	916243	916296	916349	916401	53
825	916454	916507	916559	916612	916665	916717	916770	916822	916875	916928	53
826	916980	917033	917085	917138	917190	917243	917295	917348	917401	917453	53
827	917506	917558	917611	917663	917716	917768	917821	917873	917925	917978	52
828	918030	918083	918135	918188	918240	918293	918345	918397	918450	918502	52
829	918555	918607	918659	918712	918764	918816	918869	918921	918973	919026	52
830	919078	919130	919183	919235	919287	919340	919392	919444	919497	919549	52
831	919601	919653	919706	919758	919810	919862	919915	919967	920019	920071	52
832	920123	920176	920228	920280	920332	920384	920436	920489	920541	920593	52
833	920645	920697	920749	920801	920854	920906	920958	921010	921062	921114	52
834	921166	921218	921270	921322	921374	921426	921478	921530	921582	921634	52
835	921686	921738	921790	921842	921894	921946	921998	922050	922102	922154	52
836	922206	922258	922310	922362	922414	922466	922518	922570	922622	922674	52
837	922726	922777	922829	922881	922933	922985	923037	923089	923140	923192	52
838	923244	923296	923348	923400	923451	923503	923555	923607	923658	923710	52
839	923762	923814	923866	923917	923969	924021	924072	924124	924176	924228	52
840	924279	924331	924383	924434	924486	924538	924589	924641	924693	924744	52
841	924796	924848	924899	924951	925003	925054	925106	925157	925209	925261	52
842	925312	925364	925415	925467	925518	925570	925622	925673	925725	925776	52
843	925828	925879	925931	925982	926034	926085	926137	926188	926240	926291	51
844	926342	926394	926445	926497	926548	926600	926651	926703	926754	926805	51
845	926857	926908	926960	927011	927062	927114	927165	927216	927268	927319	51
846	927370	927422	927473	927524	927576	927627	927678	927730	927781	927832	51
847	927883	927935	927986	928037	928089	928140	928191	928242	928293	928345	51
848	928396	928447	928498	928550	928601	928652	928703	928754	928805	928857	51
849	928908	928959	929010	929061	929112	929163	929215	929266	929317	929368	51

First Diff.	SECOND DIFFERENCE.																						First Diff.
	50	40	30	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
54	93	74	56	37	35	33	31	30	28	26	24	22	20	19	17	15	13	11	9	7	6	4	2	54
53	94	75	57	38	36	34	32	30	28	26	25	23	21	19	17	15	13	11	9	8	6	4	2	53
52	96	77	58	39	37	35	33	31	29	27	25	23	21	19	17	15	13	12	10	8	6	4	2	52
51	98	78	59	39	37	35	35	31	29	27	25	24	22	20	18	16	14	12	10	8	6	4	2	51

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
850	929419	929470	929521	929572	929623	929674	929725	929776	929828	929879	51
851	929930	929981	930032	930083	930134	930185	930236	930287	930338	930389	51
852	930440	930491	930542	930593	930643	930694	930745	930796	930847	930898	51
853	930949	931000	931051	931102	931153	931204	931254	931305	931356	931407	51
854	931458	931509	931560	931610	931661	931712	931763	931814	931865	931915	51
855	931966	932017	932068	932119	932169	932220	932271	932322	932372	932423	51
856	932474	932525	932575	932626	932677	932727	932778	932829	932880	932930	51
857	932981	933032	933082	933133	933184	933234	933285	933335	933386	933437	51
858	933487	933538	933589	933639	933690	933740	933791	933842	933892	933943	51
859	933993	934044	934094	934145	934195	934246	934296	934347	934397	934448	51
860	934498	934549	934599	934650	934700	934751	934801	934852	934902	934953	50
861	935003	935054	935104	935154	935205	935255	935306	935356	935407	935457	50
862	935507	935558	935608	935658	935709	935759	935810	935860	935910	935961	50
863	936011	936061	936111	936162	936212	936262	936313	936363	936413	936464	50
864	936514	936564	936614	936665	936715	936765	936815	936866	936916	936966	50
865	937016	937066	937117	937167	937217	937267	937317	937367	937418	937468	50
866	937518	937568	937618	937668	937718	937769	937819	937869	937919	937969	50
867	938019	938069	938119	938169	938219	938270	938320	938370	938420	938470	50
868	938520	938570	938620	938670	938720	938770	938820	938870	938920	938970	50
869	939020	939070	939120	939170	939220	939270	939320	939370	939419	939469	50
870	939519	939569	939619	939669	939719	939769	939819	939869	939918	939968	50
871	940018	940068	940118	940168	940218	940267	940317	940367	940417	940467	50
872	940517	940566	940616	940666	940716	940765	940815	940865	940915	940964	50
873	941014	941064	941114	941163	941213	941263	941313	941362	941412	941462	50
874	941511	941561	941611	941661	941710	941760	941810	941859	941909	941958	50
875	942008	942058	942107	942157	942207	942256	942306	942355	942405	942455	50
876	942504	942554	942603	942653	942702	942752	942802	942851	942901	942950	50
877	943000	943049	943099	943148	943198	943247	943297	943346	943396	943445	49
878	943495	943544	943593	943643	943692	943742	943791	943841	943890	943940	49
879	943989	944038	944088	944137	944187	944236	944285	944335	944384	944433	49
880	944483	944532	944581	944631	944680	944729	944779	944828	944877	944927	49
881	944976	945025	945075	945124	945173	945222	945272	945321	945370	945419	49
882	945469	945518	945567	945616	945666	945715	945764	945813	945862	945912	49
883	945961	946010	946059	946108	946157	946207	946256	946305	946354	946403	49
884	946452	946501	946551	946600	946649	946698	946747	946796	946845	946894	49
885	946943	946992	947041	947091	947140	947189	947238	947287	947336	947385	49
886	947434	947483	947532	947581	947630	947679	947728	947777	947826	947875	49
887	947924	947973	948022	948071	948119	948168	948217	948266	948315	948364	49
888	948413	948462	948511	948560	948609	948657	948706	948755	948804	948853	49
889	948902	948951	949000	949048	949097	949146	949195	949241	949292	949341	49
890	949390	949439	949488	949536	949585	949634	949683	949732	949780	949829	49
891	949878	949926	949975	950024	950073	950121	950170	950219	950268	950316	49
892	950365	950414	950462	950511	950560	950608	950657	950706	950754	950803	49
893	950852	950900	950949	950997	951046	951095	951143	951192	951240	951289	49
894	951338	951386	951435	951483	951532	951580	951629	951677	951726	951775	49
895	951823	951872	951920	951969	952017	952066	952114	952163	952211	952260	48
896	952308	952357	952405	952453	952502	952550	952599	952647	952696	952744	48
897	952792	952841	952889	952938	952986	953035	953083	953131	953180	953228	48
898	953276	953325	953373	953421	953470	953518	953566	953615	953663	953711	48
899	953760	953808	953856	953905	953953	954001	954049	954098	954146	954194	48

First Diff.	SECOND DIFFERENCE.																					First Diff.
	50	49	30	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
51	98	78	59	39	37	35	33	31	29	27	26	24	22	20	18	16	14	12	10	8	6	4	2	51
50	100	80	60	40	38	36	34	32	30	28	26	24	22	20	18	16	14	12	10	8	6	4	2	50
49		82	61	41	39	37	35	33	31	29	27	25	22	20	18	16	14	12	10	8	6	4	2	49
48		83	63	42	40	38	35	33	31	29	27	25	23	21	19	17	15	13	10	8	6	4	2	48

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
900	954243	954291	954339	954387	954436	954484	954532	954580	954628	954677	48
901	954725	954773	954821	954869	954918	954966	955014	955062	955110	955158	48
902	955207	955255	955303	955351	955399	955447	955495	955543	955592	955640	48
903	955688	955736	955784	955832	955880	955928	955976	956024	956072	956120	48
904	956168	956217	956265	956313	956361	956409	956457	956505	956553	956601	48
905	956649	956697	956745	956793	956841	956889	956936	956984	957032	957080	48
906	957128	957176	957224	957272	957320	957368	957416	957464	957512	957559	48
907	957607	957655	957703	957751	957799	957847	957895	957942	957990	958038	48
908	958086	958134	958182	958229	958277	958325	958373	958421	958468	958516	48
909	958561	958612	958659	958707	958755	958803	958851	958898	958946	958994	48
910	959041	959089	959137	959185	959232	959280	959328	959375	959423	959471	48
911	959518	959566	959614	959661	959709	959757	959804	959852	959900	959947	48
912	959995	960043	960090	960138	960185	960233	960281	960328	960376	960423	48
913	960471	960518	960566	960614	960661	960709	960756	960804	960851	960899	48
914	960946	960994	961041	961089	961136	961184	961231	961279	961326	961374	48
915	961421	961469	961516	961564	961611	961658	961706	961753	961801	961848	47
916	961896	961943	961990	962038	962085	962133	962180	962227	962275	962322	47
917	962369	962417	962464	962511	962559	962606	962653	962701	962748	962795	47
918	962843	962890	962937	962985	963032	963079	963126	963174	963221	963268	47
919	963316	963363	963410	963457	963505	963552	963599	963646	963693	963741	47
920	963788	963835	963882	963929	963977	964024	964071	964118	964165	964213	47
921	964260	964307	964354	964401	964448	964495	964543	964590	964637	964684	47
922	964731	964778	964825	964872	964919	964966	965014	965061	965108	965155	47
923	965202	965249	965296	965343	965390	965437	965484	965531	965578	965625	47
924	965672	965719	965766	965813	965860	965907	965954	966001	966048	966095	47
925	966142	966189	966236	966283	966330	966376	966423	966470	966517	966564	47
926	966611	966658	966705	966752	966799	966845	966892	966939	966986	967033	47
927	967080	967127	967173	967220	967267	967314	967361	967408	967454	967501	47
928	967548	967595	967642	967688	967735	967782	967829	967875	967922	967969	47
929	968016	968063	968109	968156	968203	968249	968296	968343	968390	968436	47
930	968483	968530	968576	968623	968670	968716	968763	968810	968856	968903	47
931	968950	968996	969043	969090	969136	969183	969230	969276	969323	969369	47
932	969416	969463	969509	969556	969602	969649	969695	969742	969789	969835	47
933	969882	969928	969975	970021	970068	970114	970161	970207	970254	970300	47
934	970347	970393	970440	970486	970533	970579	970626	970672	970719	970765	47
935	970812	970858	970905	970951	970997	971044	971090	971137	971183	971229	46
936	971276	971322	971369	971415	971461	971508	971554	971601	971647	971693	46
937	971740	971786	971832	971879	971925	971971	972018	972064	972110	972157	46
938	972203	972249	972295	972342	972388	972434	972481	972527	972573	972619	46
939	972666	972712	972758	972804	972851	972897	972943	972989	973035	973082	46
940	973128	973174	973220	973266	973313	973359	973405	973451	973497	973544	46
941	973590	973636	973682	973728	973774	973820	973866	973913	973959	974005	46
942	974051	974097	974143	974189	974235	974281	974327	974374	974420	974466	46
943	974512	974558	974604	974650	974696	974742	974788	974834	974880	974926	46
944	974972	975018	975064	975110	975156	975202	975248	975294	975340	975386	46
945	975432	975478	975524	975570	975616	975662	975708	975753	975799	975845	46
946	975891	975937	975983	976029	976075	976121	976167	976212	976258	976304	46
947	976350	976396	976442	976488	976533	976579	976625	976671	976717	976763	46
948	976808	976854	976900	976946	976992	977037	977083	977129	977175	977220	46
949	977266	977312	977358	977404	977449	977495	977541	977586	977632	977678	46

First Diff.	SECOND DIFFERENCE.																					First Diff.
	40	30	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
48	83	63	42	40	38	35	33	31	29	27	25	23	21	19	17	15	13	10	8	6	4	2	48
47	85	64	43	40	38	36	34	32	30	28	26	23	21	19	17	15	13	11	9	6	4	2	47
46	87	65	44	41	39	37	35	33	30	28	26	24	22	20	17	15	13	11	9	7	4	2	46

TABLE XXIV.

Logarithms of Numbers.

Num.	0	1	2	3	4	5	6	7	8	9	First Diff.
950	977724	977769	977815	977861	977906	977952	977998	978044	978089	978135	46
951	978181	978226	978272	978318	978363	978409	978454	978500	978546	978591	46
952	978637	978683	978728	978774	978819	978865	978911	978956	979002	979047	46
953	979093	979139	979184	979230	979275	979321	979366	979412	979457	979503	46
954	979548	979594	979639	979685	979730	979776	979821	979867	979912	979958	46
955	980003	980049	980094	980140	980185	980231	980276	980322	980367	980413	45
956	980458	980503	980549	980594	980640	980685	980730	980776	980821	980867	45
957	980912	980957	981003	981048	981093	981139	981184	981230	981275	981320	45
958	981366	981411	981456	981502	981547	981592	981637	981683	981728	981773	45
959	981819	981864	981909	981954	982000	982045	982090	982136	982181	982226	45
960	982271	982317	982362	982407	982452	982497	982543	982588	982633	982678	45
961	982723	982769	982814	982859	982904	982949	982995	983040	983085	983130	45
962	983175	983220	983265	983311	983356	983401	983446	983491	983537	983581	45
963	983626	983671	983717	983762	983807	983852	983897	983942	983987	984032	45
964	984077	984122	984167	984212	984257	984302	984347	984392	984437	984482	45
965	984527	984572	984617	984662	984707	984752	984797	984842	984887	984932	45
966	984977	985022	985067	985112	985157	985202	985247	985292	985337	985382	45
967	985427	985471	985516	985561	985606	985651	985696	985741	985786	985831	45
968	985875	985920	985965	986010	986055	986100	986145	986189	986234	986279	45
969	986324	986369	986413	986458	986503	986548	986593	986637	986682	986727	45
970	986772	986817	986861	986906	986951	986996	987040	987085	987130	987175	45
971	987219	987264	987309	987353	987398	987443	987488	987532	987577	987622	45
972	987666	987711	987756	987800	987845	987890	987934	987979	988024	988068	45
973	988113	988158	988202	988247	988291	988336	988381	988425	988470	988514	45
974	988559	988604	988648	988693	988737	988782	988826	988871	988916	988960	45
975	989005	989049	989094	989138	989183	989227	989272	989316	989361	989405	44
976	989450	989494	989539	989583	989628	989672	989717	989761	989807	989850	44
977	989895	989939	989984	990028	990072	990117	990161	990206	990250	990294	44
978	990339	990383	990428	990472	990516	990561	990605	990650	990694	990738	44
979	990783	990827	990871	990916	990960	991004	991049	991093	991137	991182	44
980	991226	991270	991315	991359	991403	991448	991492	991536	991581	991625	44
981	991669	991713	991758	991802	991846	991890	991935	991979	992023	992067	44
982	992112	992156	992200	992244	992288	992333	992377	992421	992465	992509	44
983	992554	992598	992642	992686	992730	992774	992819	992863	992907	992951	44
984	992995	993039	993083	993128	993172	993216	993260	993304	993348	993392	44
985	993436	993480	993524	993569	993613	993657	993701	993745	993789	993833	44
986	993877	993921	993965	994009	994053	994097	994141	994185	994229	994273	44
987	994317	994361	994405	994449	994493	994537	994581	994625	994669	994713	44
988	994757	994801	994845	994889	994933	994977	995021	995065	995109	995152	44
989	995196	995240	995284	995328	995372	995416	995460	995504	995547	995591	44
990	995635	995679	995723	995767	995811	995855	995898	995942	995986	996030	44
991	996074	996118	996161	996205	996249	996293	996337	996380	996424	996468	44
992	996512	996555	996599	996643	996687	996731	996774	996818	996862	996906	44
993	996949	996993	997037	997080	997124	997168	997211	997255	997299	997343	44
994	997386	997430	997474	997517	997561	997605	997648	997692	997736	997779	44
995	997823	997867	997910	997954	997998	998041	998085	998129	998172	998216	44
996	998259	998303	998347	998390	998434	998477	998521	998564	998608	998652	44
997	998695	998739	998782	998826	998869	998913	998956	999000	999044	999087	44
998	999131	999174	999218	999261	999305	999348	999392	999435	999479	999522	43
999	999566	999609	999652	999696	999739	999783	999826	999870	999913	999957	43

First Diff.	SECOND DIFFERENCE.																			First Diff.
	40	30	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
46	87	65	44	41	39	37	35	33	30	28	26	24	22	20	17	15	13	11	9	7	4	2	46
45	89	67	45	42	40	38	36	33	31	29	27	24	22	20	18	16	13	11	9	7	4	2	45
44	91	68	45	43	41	39	36	34	32	30	27	25	23	20	18	16	14	11	9	7	5	2	44
43	93	70	46	44	42	40	37	35	33	30	28	26	23	21	19	16	14	12	9	7	5	2	43

Natural Versed Sines.

M.	0°	Parts	1°	Parts	2°	Parts	3°	Parts	4°	Parts	5°	Parts	6°	Parts	S.
0	000000	0	000152	0	000609	0	001370	0	002436	0	003805	0	005478	0	0
1	000000	0	000157	0	000619	1	001385	1	002456	1	003831	1	005509	1	1
2	000000	0	000163	0	000630	1	001401	1	002477	1	003856	1	005539	1	2
3	000000	0	000168	1	000640	1	001416	1	002497	1	003882	1	005570	2	3
4	000001	0	000173	1	000650	1	001432	1	002518	2	003907	2	005600	2	4
5	000001	0	000179	1	000661	1	001448	1	002538	2	003933	2	005631	3	5
6	000001	0	000184	1	000672	1	001463	2	002559	2	003959	3	005662	3	6
7	000002	0	000190	1	000682	1	001479	2	002580	3	003985	3	005693	4	7
8	000003	0	000196	1	000693	2	001495	2	002601	3	004011	4	005724	4	8
9	000003	0	000201	1	000704	2	001511	3	002622	3	004037	4	005755	5	9
10	000004	0	000207	1	000715	2	001527	3	002643	4	004063	5	005786	5	10
11	000005	0	000213	1	000726	2	001543	3	002664	4	004089	5	005818	6	11
12	000006	1	000219	2	000737	3	001559	4	002685	5	004116	6	005849	7	12
13	000007	1	000226	2	000748	3	001575	4	002707	5	004142	6	005880	7	13
14	000008	1	000232	2	000760	3	001592	4	002728	5	004168	7	005912	8	14
15	000009	1	000238	2	000771	3	001608	4	002750	6	004195	7	005944	8	15
16	000011	1	000244	2	000782	3	001625	5	002771	6	004222	7	005975	9	16
17	000012	1	000251	2	000794	4	001641	5	002793	6	004248	8	006007	9	17
18	000014	1	000257	2	000806	4	001658	5	002815	7	004275	8	006039	10	18
19	000015	1	000264	2	000817	4	001675	6	002837	7	004302	9	006071	10	19
20	000017	1	000271	3	000829	4	001692	6	002859	8	004329	9	006103	11	20
21	000019	1	000278	3	000841	4	001709	6	002881	8	004356	10	006135	12	21
22	000020	1	000284	3	000853	5	001726	7	002903	8	004383	10	006167	12	22
23	000022	1	000291	3	000865	5	001743	7	002925	9	004411	11	006200	13	23
24	000024	1	000299	3	000877	5	001760	7	002947	9	004438	11	006232	13	24
25	000026	1	000306	3	000889	5	001777	7	002970	9	004465	12	006264	14	25
26	000029	1	000313	3	000902	6	001795	8	002993	10	004493	12	006297	14	26
27	000031	1	000320	3	000914	6	001812	8	003015	10	004520	13	006330	15	27
28	000033	1	000328	4	000927	6	001830	8	003037	11	004548	13	006362	15	28
29	000036	1	000335	4	000939	6	001847	9	003060	11	004576	14	006395	16	29
30	000038	1	000343	4	000952	6	001865	9	003083	11	004604	14	006428	17	30
31	000041	1	000350	4	000964	7	001883	9	003105	12	004632	14	006461	17	31
32	000043	1	000358	4	000977	7	001901	9	003128	12	004660	15	006494	18	32
33	000046	1	000366	4	000990	7	001919	10	003151	13	004688	15	006527	18	33
34	000049	1	000374	4	001003	7	001937	10	003175	13	004716	16	006560	19	34
35	000052	2	000382	4	001016	7	001955	10	003198	13	004744	16	006594	19	35
36	000055	2	000390	5	001029	8	001973	11	003221	14	004773	17	006627	20	36
37	000058	2	000398	5	001043	8	001992	11	003244	14	004801	17	006661	20	37
38	000061	2	000406	5	001056	8	002010	11	003268	14	004829	18	006694	21	38
39	000064	2	000415	5	001069	8	002028	12	003291	15	004858	18	006728	21	39
40	000068	2	000423	5	001083	8	002047	12	003315	15	004887	19	006762	22	40
41	000071	2	000432	5	001096	9	002066	12	003339	16	004916	19	006795	23	41
42	000075	2	000440	5	001110	9	002084	12	003363	16	004944	20	006829	23	42
43	000078	2	000449	6	001124	9	002103	13	003386	16	004973	20	006863	24	43
44	000082	2	000458	6	001138	9	002122	13	003410	17	005002	20	006897	24	44
45	000086	2	000466	6	001152	10	002141	13	003434	17	005031	21	006931	25	45
46	000089	2	000475	6	001166	10	002160	14	003459	17	005061	21	006966	25	46
47	000093	2	000484	0	001180	10	002179	14	003483	18	005090	22	007000	26	47
48	000097	2	000493	6	001194	10	002198	14	003507	18	005119	22	007034	26	48
49	000102	2	000503	6	001208	10	002218	15	003531	19	005149	23	007069	27	49
50	000106	2	000512	6	001222	11	002237	15	003556	19	005178	23	007103	28	50
51	000110	2	000521	7	001237	11	002257	15	003580	19	005208	24	007138	28	51
52	000114	2	000531	7	001251	11	002276	15	003605	20	005237	24	007173	29	52
53	000119	2	000540	7	001266	11	002296	16	003630	20	005267	25	007208	29	53
54	000123	2	000550	7	001281	11	002316	16	003655	20	005297	25	007243	30	54
55	000128	2	000559	7	001295	12	002335	16	003680	21	005327	26	007278	30	55
56	000133	2	000569	7	001310	12	002355	17	003705	21	005357	26	007313	31	56
57	000137	2	000579	7	001325	12	002375	17	003730	22	005387	27	007348	31	57
58	000142	3	000589	7	001340	12	002395	17	003755	22	005417	27	007383	32	58
59	000147	3	000599	8	001355	12	002416	17	003780	22	005448	27	007418	32	59

TABLE XXV.

Natural Versed Sines.

M.	7°	Parts	8°	Parts	9°	Parts	10°	Parts	11°	Parts	12°	Parts	13°	Parts	S.
0	007454	0	009732	0	012312	0	015192	0	018373	0	021852	0	025630	0	0
1	007489	1	009772	1	012357	1	015243	1	018428	1	021913	1	025695	1	1
2	007525	1	009813	1	012403	2	015293	2	018484	2	021974	2	025761	2	2
3	007561	2	009854	2	012449	2	015344	3	018540	3	022034	3	025827	3	3
4	007596	3	009894	3	012494	3	015395	4	018595	4	022095	4	025892	4	4
5	007632	3	009935	3	012540	4	015446	4	018651	5	022156	5	025958	6	5
6	007668	4	009976	4	012586	5	015497	5	018707	6	022217	6	026024	7	6
7	007704	4	010017	5	012632	6	015548	6	018763	7	022278	7	026090	8	7
8	007740	5	010058	6	012678	6	015599	7	018819	8	022339	8	026156	9	8
9	007776	6	010100	6	012725	7	015650	8	018876	9	022400	9	026222	10	9
10	007813	6	010141	7	012771	8	015701	9	018932	10	022461	10	026288	11	10
11	007849	7	010182	8	012817	9	015753	10	018988	11	022523	12	026355	12	11
12	007885	8	010224	8	012864	10	015804	11	019045	12	022584	13	026421	14	12
13	007922	8	010265	9	012910	10	015856	12	019101	13	022646	14	026488	15	13
14	007958	9	010307	10	012957	11	015908	12	019158	14	022707	15	026554	16	14
15	007995	9	010349	10	013004	12	015959	13	019215	15	022769	16	026621	17	15
16	008032	10	010390	11	013050	13	016011	14	019271	15	022831	17	026687	18	16
17	008069	11	010432	12	013097	14	016063	15	019328	16	022892	18	026754	19	17
18	008106	11	010474	13	013144	14	016115	16	019385	17	022954	19	026821	20	18
19	008143	12	010516	13	013191	15	016167	17	019442	18	023016	20	026888	21	19
20	008180	13	010558	14	013238	16	016219	18	019499	19	023079	21	026955	23	20
21	008217	13	010601	15	013286	17	016271	19	019557	20	023141	22	027022	24	21
22	008254	14	010643	15	013333	18	016324	19	019614	21	023203	23	027089	25	22
23	008291	15	010685	16	013380	18	016376	20	019671	22	023265	24	027157	26	23
24	008329	15	010728	17	013428	19	016428	21	019729	23	023328	25	027224	27	24
25	008366	16	010770	17	013475	20	016481	22	019786	24	023390	26	027292	28	25
26	008404	16	010813	18	013523	21	016534	23	019844	25	023453	27	027359	29	26
27	008442	17	010855	19	013571	22	016586	24	019902	26	023515	28	027427	31	27
28	008479	18	010898	20	013618	22	016639	25	019959	27	023578	29	027494	32	28
29	008517	18	010941	20	013666	23	016692	26	020017	28	023641	30	027562	33	29
30	008555	19	010984	21	013714	24	016745	27	020075	29	023704	31	027630	34	30
31	008593	20	011027	22	013762	25	016798	27	020133	30	023767	33	027698	35	31
32	008631	20	011070	23	013811	26	016851	28	020191	31	023830	34	027766	36	32
33	008669	21	011113	24	013859	26	016904	29	020250	32	023893	35	027834	37	33
34	008708	22	011157	24	013907	27	016958	30	020308	33	023956	36	027902	38	34
35	008746	22	011200	25	013955	28	017011	31	020366	34	024020	37	027970	40	35
36	008784	23	011244	26	014004	29	017065	32	020425	35	024083	38	028039	41	36
37	008823	23	011287	26	014052	30	017118	33	020483	36	024147	39	028107	42	37
38	008862	24	011331	27	014101	30	017172	34	020542	37	024210	40	028176	43	38
39	008900	25	011374	28	014150	31	017226	35	020601	38	024274	41	028245	44	39
40	008939	25	011418	29	014199	32	017279	35	020659	39	024338	42	028313	45	40
41	008978	26	011462	29	014248	33	017333	36	020718	40	024402	43	028382	46	41
42	009017	27	011506	30	014296	34	017387	37	020777	41	024465	44	028451	48	42
43	009056	27	011550	31	014346	34	017441	38	020836	42	024529	45	028520	49	43
44	009095	28	011594	31	044395	35	017495	39	020895	43	024594	46	028589	50	44
45	009134	28	011638	32	014444	36	017550	40	020954	44	024658	47	028658	51	45
46	009173	29	011683	33	014493	37	017604	41	021014	45	024722	48	028727	52	46
47	009213	30	011727	34	014543	38	017658	42	021073	45	024786	49	028796	53	47
48	009252	30	011772	34	014592	38	017713	43	021133	46	024851	50	028866	54	48
49	009292	31	011816	35	014642	39	017767	43	021192	47	024915	51	028935	55	49
50	009331	32	011861	36	014691	40	017822	44	021252	48	024980	52	029005	57	50
51	009371	32	011905	36	014741	41	017877	45	021311	49	025044	54	029074	58	51
52	009411	33	011950	37	014791	42	017931	46	021371	50	025109	55	029144	59	52
53	009451	34	011995	38	014841	43	017986	47	021431	51	025174	56	029214	60	53
54	009491	34	012040	39	014891	43	018041	48	021491	52	025239	57	029284	61	54
55	009531	35	012085	39	014941	44	018096	49	021551	53	025304	58	029353	62	55
56	009571	35	012130	40	014991	45	018151	50	021611	54	025369	59	029423	63	56
57	009611	36	012175	41	015041	46	018207	50	021671	55	025434	60	029494	65	57
58	009651	37	012221	42	015091	47	018262	51	021732	56	025499	61	029564	66	58
59	009691	37	012266	42	015142	47	018317	52	021792	57	025565	62	029634	67	59

Natural Versed Sines.

M.	14°	Parts	15°	Parts	16°	Parts	17°	Parts	18°	Parts	19°	Parts	20°	Parts	S.
0	029704	0	034074	0	038738	0	043695	0	048943	0	054481	0	060307	0	0
1	029775	1	034150	1	038819	1	043780	1	049033	2	054576	2	060407	2	1
2	029845	2	034225	3	038899	3	043866	3	049123	3	054671	3	060507	3	2
3	029916	4	034300	4	038979	4	043951	4	049214	5	054766	5	060606	5	3
4	029986	5	034376	5	039060	5	044036	6	049304	6	054861	6	060706	7	4
5	030057	6	034452	6	039140	7	044121	7	049394	8	054956	8	060806	8	5
6	030128	7	034527	8	039221	8	044207	9	049484	9	055051	10	060906	10	6
7	030199	8	034603	9	039302	10	044293	10	049575	11	055146	11	061006	12	7
8	030270	10	034679	10	039382	11	044378	12	049665	12	055242	13	061106	14	8
9	030341	11	034755	12	039463	12	044464	13	049756	14	055337	15	061206	15	9
10	030412	12	034831	13	039544	14	044550	15	049846	15	055432	16	061306	17	10
11	030483	13	034907	14	039625	15	044636	16	049937	17	055528	18	061407	19	11
12	030555	14	034984	15	039706	16	044722	17	050028	18	055624	19	061507	20	12
13	030626	16	035060	17	039788	18	044808	19	050119	20	055719	21	061607	22	13
14	030698	17	035136	18	039869	19	044894	20	050210	22	055815	23	061708	24	14
15	030769	18	035213	19	039950	21	044980	22	050301	23	055911	24	061809	25	15
16	030841	19	035289	21	040032	22	045066	23	050392	25	056007	26	061909	27	16
17	030912	21	035366	22	040113	23	045153	25	050483	26	056103	27	062010	29	17
18	030984	22	035443	23	040195	25	045239	26	050575	28	056199	29	062111	30	18
19	031056	23	035519	25	040276	26	045326	28	050666	29	056295	31	062212	32	19
20	031128	24	035596	26	040358	27	045412	29	050757	31	056391	32	062313	34	20
21	031200	25	035673	27	040440	29	045499	31	050849	32	056488	34	062414	36	21
22	031272	27	035750	28	040522	30	045586	32	050941	34	056584	36	062515	37	22
23	031344	28	035827	30	040604	32	045673	34	051032	35	056681	37	062617	39	23
24	031417	29	035905	31	040686	33	045760	35	051124	37	056777	39	062718	41	24
25	031489	30	035982	32	040768	34	045847	36	051216	39	056874	40	062819	42	25
26	031562	31	036059	34	040850	36	045934	38	051308	40	056971	42	062921	44	26
27	031634	33	036137	35	040933	37	046021	39	051400	42	057068	44	063023	46	27
28	031707	34	036214	36	041015	38	046108	41	051492	43	057164	45	063124	47	28
29	031780	35	036292	37	041098	40	046196	42	051584	45	057261	47	063226	49	29
30	031852	36	036370	39	041180	41	046283	44	051676	46	057359	48	063328	51	30
31	031925	37	036447	40	041263	43	046371	45	051769	48	057456	50	063430	52	31
32	031998	39	036525	41	041346	44	046458	47	051861	49	057553	52	063532	54	32
33	032071	40	036603	43	041428	45	046546	48	051954	51	057650	53	063634	56	33
34	032144	41	036681	44	041511	47	046634	50	052046	52	057748	55	063736	57	34
35	032217	42	036759	45	041594	48	046721	51	052139	54	057845	57	063838	59	35
36	032291	43	036837	46	041677	49	046809	52	052232	55	057943	58	063940	61	36
37	032364	45	036916	48	041761	51	046897	54	052324	57	058040	60	064043	63	37
38	032438	46	036994	49	041844	52	046985	55	052417	59	058138	61	064145	64	38
39	032511	47	037072	50	041927	54	047074	57	052510	60	058236	63	064248	66	39
40	032585	48	037151	52	042010	55	047162	58	052603	62	058334	65	064350	68	40
41	032658	49	037230	53	042094	56	047250	60	052696	63	058431	66	064453	69	41
42	032732	51	037308	54	042178	58	047339	61	052790	65	058529	68	064556	71	42
43	032806	52	037387	56	042261	59	047427	63	052883	66	058628	69	064659	73	43
44	032880	53	037466	57	042345	60	047516	64	052976	68	058726	71	064762	74	44
45	032954	54	037545	58	042429	62	047604	66	053070	69	058824	73	064865	76	45
46	033028	56	037624	59	042513	63	047693	67	053163	71	058922	74	064968	78	46
47	033102	57	037703	61	042597	65	047782	69	053257	72	059021	76	065071	79	47
48	033177	58	037782	62	042681	66	047871	70	053351	74	059119	78	065174	81	48
49	033251	59	037861	63	042765	67	047960	71	053445	76	059218	79	065278	83	49
50	033325	60	037941	65	042849	69	048049	73	053538	77	059316	81	065381	85	50
51	033400	62	038020	66	042933	70	048138	74	053632	79	059415	82	065485	86	51
52	033474	63	038099	67	043017	71	048227	76	053726	80	059514	84	065588	88	52
53	033549	64	038179	68	043102	73	048316	77	053820	82	059613	86	065692	90	53
54	033624	65	038259	70	043186	74	048406	79	053915	83	059712	87	065796	91	54
55	033699	66	038338	71	043271	76	048495	80	054009	85	059811	89	065899	93	55
56	033774	68	038418	72	043356	77	048585	82	054103	86	059910	90	066003	95	56
57	033849	69	038498	74	043440	78	048674	83	054198	88	060009	92	066107	96	57
58	033924	70	038578	75	043525	80	048764	85	054292	89	060109	94	066211	98	58
59	033999	71	038658	76	043610	81	048854	86	054387	91	060208	95	066315	100	59

TABLE XXV.

Natural Versed Sines.

M.	21°	Parts	22°	Parts	23°	Parts	24°	Parts	25°	Parts	26°	Parts	27°	Parts	S.
0	066419	0	072816	0	079495	0	086455	0	093692	0	101206	0	108993	0	0
1	066524	2	072925	2	079609	2	086573	2	093815	2	101334	2	109126	2	1
2	066628	4	073034	4	079723	4	086691	4	093938	4	101461	4	109258	4	2
3	066733	5	073143	6	079836	6	086810	6	094061	6	101589	7	109390	7	3
4	066837	7	073253	7	079950	8	086928	8	094185	8	101717	9	109522	9	4
5	066942	9	073362	9	080064	10	087047	10	094308	10	101844	11	109655	11	5
6	067046	11	073471	11	080179	12	087166	12	094431	13	101972	13	109787	13	6
7	067151	12	073581	13	080293	13	087285	14	094555	15	102100	15	109920	16	7
8	067256	14	073690	15	080407	15	067404	16	094678	17	102229	17	110052	18	8
9	067361	16	073800	17	080521	17	087523	18	094802	19	102357	19	110185	20	9
10	067466	18	073910	19	080636	19	087642	20	094925	21	102485	22	110318	22	10
11	067571	19	074020	20	080750	21	087761	22	095049	23	102613	24	110451	25	11
12	067676	21	074129	22	080865	23	087880	24	095173	25	102742	26	110584	27	12
13	067781	23	074239	24	080979	25	087999	26	095297	27	102870	28	110717	29	13
14	067887	25	074349	26	081094	27	088119	28	095421	29	102999	30	110850	31	14
15	067992	27	074459	28	081209	29	088238	30	095545	31	103127	32	110983	34	15
16	068098	28	074570	30	081324	31	088357	32	095669	33	103256	35	111116	36	16
17	068203	30	074680	32	081439	33	088477	34	095793	36	103385	37	111249	38	17
18	068309	32	074790	33	081554	35	088597	36	095917	38	103514	39	111383	40	18
19	068414	34	074901	35	081669	37	088716	38	096042	40	103642	41	111516	43	19
20	068520	35	075011	37	081784	39	088836	40	096166	42	103771	43	111650	45	20
21	068626	37	075122	39	081899	41	088956	42	096291	44	103901	45	111783	47	21
22	068732	39	075232	41	082014	42	089076	44	096415	46	104030	47	111917	49	22
23	068838	41	075343	43	082130	44	089196	46	096540	48	104159	50	112051	52	23
24	068944	43	075454	45	082245	46	089316	48	096665	50	104288	52	112185	54	24
25	069050	44	075565	47	082361	48	089437	50	096790	52	104418	54	112319	56	25
26	069157	46	075676	48	082477	50	089557	52	096914	54	104547	56	112453	58	26
27	069263	48	075787	50	082592	52	089677	54	097039	56	104677	58	112587	61	27
28	069369	50	075898	52	082709	54	089798	56	097164	59	104806	60	112721	63	28
29	069476	51	076009	54	082824	56	089918	58	097290	61	104936	63	112855	65	29
30	069582	53	076120	56	082940	58	090039	60	097415	63	105066	65	112989	67	30
31	069689	55	076232	58	083056	60	090159	62	097540	65	105195	67	113124	69	31
32	069796	57	076343	59	083172	62	090280	64	097665	67	105325	69	113258	72	32
33	069903	59	076455	61	083288	64	090401	66	097791	69	105455	71	113392	74	33
34	070010	60	076566	63	083405	66	090522	68	097916	71	105585	73	113527	76	34
35	070117	62	076678	65	083521	68	090643	70	098042	73	105716	76	113662	78	35
36	070224	64	076790	67	083637	70	090764	72	098167	75	105846	78	113796	81	36
37	070331	66	076902	69	083754	71	090885	74	098293	77	105976	80	113931	83	37
38	070438	67	077014	70	083870	73	091006	76	098419	79	106106	82	114066	85	38
39	070545	69	077126	72	083987	75	091128	78	098545	82	106237	84	114201	87	39
40	070652	71	077238	74	084104	77	091249	80	098671	84	106367	86	114336	90	40
41	070760	73	077350	76	084221	79	091370	82	098797	86	106498	88	114471	92	41
42	070867	75	077462	78	084337	81	091492	84	098923	88	106629	91	114606	94	42
43	070975	76	077574	80	084454	83	091613	86	099049	90	106759	93	114742	96	43
44	071083	78	077687	82	084571	85	091735	88	099175	92	106890	95	114877	99	44
45	071190	80	077799	84	084689	87	091857	90	099302	94	107021	97	115012	101	45
46	071298	82	077912	86	084806	89	091979	92	099428	96	107152	99	115148	103	46
47	071406	83	078024	87	084923	91	092101	94	099555	98	107283	101	115283	105	47
48	071514	85	078137	89	085040	93	092223	96	099681	100	107414	104	115419	108	48
49	071622	87	078250	91	085158	95	092345	98	099808	102	107545	106	115555	110	49
50	071730	89	078362	93	085275	97	092467	100	099935	105	107677	108	115691	112	50
51	071839	91	078475	95	085393	99	092589	102	100061	107	107808	110	115826	114	51
52	071947	92	078588	97	085510	100	092711	104	100188	109	107939	112	115962	117	52
53	072055	94	078701	99	085628	102	092834	108	100315	111	108071	114	116098	119	53
54	072164	96	078815	100	085746	104	092956	106	100442	113	108202	117	116234	121	54
55	072272	98	078928	102	085864	106	093078	110	100569	115	108334	119	116371	123	55
56	072381	99	079041	104	085982	108	093201	112	100696	117	108466	121	116507	126	56
57	072490	101	079154	106	086100	110	093324	114	100824	119	108598	123	116643	128	57
58	072598	103	079268	108	086218	112	093446	116	100951	121	108730	125	116779	130	58
59	072707	105	079382	100	086336	114	093569	118	101078	123	108861	127	116916	132	59

Natural Versed Sines.

M.	28°	Parts	29°	Parts	30°	Parts	31°	Parts	32°	Parts	33°	Parts	34°	Parts	S.
0	117052	0	125380	0	133975	0	142833	0	151952	0	161329	0	170962	0	0
1	117189	2	125521	2	134120	2	142983	2	152106	3	161488	3	171125	3	1
2	117326	5	125662	5	134266	5	143132	5	152260	5	161646	5	171288	5	2
3	117462	7	125804	7	134411	7	143282	8	152415	8	161805	8	171451	8	3
4	117599	9	125945	10	134557	10	143133	10	152569	10	161964	11	171614	11	4
5	117736	12	126086	12	134703	12	143583	13	152724	13	162122	13	171777	14	5
6	117873	14	126228	14	134849	15	143733	15	152878	16	162281	16	171940	16	6
7	118010	16	126369	17	134995	17	143883	18	153033	18	162440	19	172103	19	7
8	118147	18	126511	19	135141	20	144034	20	153187	21	162599	21	172266	22	8
9	118284	21	126653	22	135287	22	144184	23	153342	23	162758	24	172429	25	9
10	118422	23	126794	24	135433	25	144335	25	153497	26	162917	27	172593	27	10
11	118559	25	126936	26	135579	27	144485	28	153652	29	163076	29	172756	30	11
12	118697	28	127078	29	135725	29	144636	30	153807	31	163236	32	172920	33	12
13	118834	30	127220	31	135872	32	144786	33	153962	34	163395	35	173083	36	13
14	118972	32	127362	33	136018	34	144937	35	154117	36	163554	38	173247	38	14
15	119109	35	127504	36	136164	37	145088	38	154272	39	163714	40	173410	41	15
16	119247	37	127646	38	136311	39	145239	40	154427	42	163873	43	173574	44	16
17	119385	39	127788	41	136458	42	145390	43	154583	44	164033	46	173738	47	17
18	119523	42	127931	43	136604	44	145541	46	154738	47	164193	48	173902	49	18
19	119661	44	128073	45	136751	47	145692	48	154894	49	164352	51	174066	52	19
20	119799	46	128216	48	136898	49	145844	51	155049	52	164512	54	174230	55	20
21	119937	48	128358	50	137045	52	145995	53	155205	55	164672	56	174394	58	21
22	120075	51	128501	53	137192	54	146146	56	155360	57	164832	59	174558	60	22
23	120213	53	128643	55	137339	57	146298	58	155516	60	164992	62	174722	63	23
24	120351	55	128786	57	137486	59	146149	61	155672	62	165152	64	174887	66	24
25	120490	58	128929	60	137634	62	146601	63	155828	65	165312	67	175051	69	25
26	120628	60	129072	62	137781	64	146752	66	155984	68	165473	70	175215	71	26
27	120767	62	129215	65	137928	66	146904	68	156140	70	165633	72	175380	74	27
28	120905	65	129358	67	138076	69	147056	71	156296	73	165793	75	175544	77	28
29	121044	67	129501	69	138223	71	147208	73	156452	75	165954	78	175709	80	29
30	121183	69	129644	72	138371	74	147360	76	156609	78	166114	80	175874	82	30
31	121322	72	129788	74	138519	76	147512	78	156765	81	166275	83	176039	85	31
32	121461	74	129931	77	138666	79	147664	81	156921	83	166435	86	176203	88	32
33	121600	76	130074	79	138814	81	147816	84	157078	86	166596	89	176368	91	33
34	121739	78	130218	81	138962	84	147968	86	157234	88	166757	91	176533	93	34
35	121878	81	130361	84	139110	86	148121	89	157391	91	166918	94	176698	96	35
36	122017	83	130505	86	139258	88	148273	91	157547	94	167079	97	176864	99	36
37	122156	85	130649	88	139406	91	148425	94	157704	96	167240	99	177029	102	37
38	122296	88	130793	91	139554	93	148578	96	157861	99	167401	102	177194	104	38
39	122435	90	130936	93	139703	94	148731	99	158018	101	167562	105	177359	107	39
40	122575	92	131080	96	139851	98	148883	101	158175	104	167723	107	177525	110	40
41	122714	95	131224	98	139999	101	149036	104	158332	107	167885	110	177690	113	41
42	122854	97	131368	100	140148	103	149189	106	158489	109	168046	113	177856	115	42
43	122994	99	131513	103	140296	106	149342	109	158646	112	168207	115	178022	118	43
44	123133	102	131657	105	140145	108	149495	111	158804	114	168369	118	178187	121	44
45	123273	104	131801	108	140594	111	149648	114	158961	117	168530	121	178353	124	45
46	123413	106	131946	110	140742	113	149801	116	159118	120	168692	123	178519	126	46
47	123553	108	132090	112	140891	116	149954	119	159276	122	168854	126	178685	129	47
48	123693	111	132235	115	141040	118	150107	122	159433	125	169016	129	178851	132	48
49	123833	113	132379	117	141189	120	150261	124	159591	127	169177	131	179017	135	49
50	123974	115	132524	120	141338	123	150414	127	159749	130	169339	134	179183	137	50
51	124114	118	132669	122	141487	125	150567	129	159906	133	169501	137	179349	140	51
52	124254	120	132813	124	141636	128	150721	132	160061	135	169663	139	179515	143	52
53	124395	122	132958	127	141786	130	150875	134	160222	138	169826	142	179682	146	53
54	124535	125	133103	129	141935	133	151028	137	160380	140	169988	145	179848	148	54
55	124676	127	133248	132	142085	135	151182	139	160538	143	170150	148	180015	151	55
56	124817	129	133393	134	142234	138	151336	142	160696	146	170312	150	180181	154	56
57	124958	132	133539	136	142384	140	151490	144	160854	148	170475	153	180348	157	57
58	125098	134	133684	139	142533	143	151644	147	161013	151	170637	156	180514	159	58
59	125239	136	133829	141	142683	145	151798	149	161171	153	170800	158	180681	163	59

TABLE XXV.

Natural Versed Sines.

M.	35°	Parts	36°	Parts	37°	Parts	38°	Parts	39°	Parts	40°	Parts	41°	Parts	S.
0	180848	0	190983	0	201364	0	211989	0	222854	0	233956	0	245290	0	0
1	181015	3	191154	3	201540	3	212168	3	223037	3	234143	3	245481	3	1
2	181182	6	191325	6	201715	6	212348	6	223220	6	234330	6	245672	6	2
3	181349	8	191496	9	201890	9	212527	9	223404	9	234517	9	245863	10	3
4	181516	11	191667	11	202065	12	212706	12	223587	12	234704	13	246054	13	4
5	181683	14	191839	14	202241	15	212886	15	223770	15	234891	16	246245	16	5
6	181850	17	192010	17	202416	18	213065	18	223954	18	235079	19	246437	19	6
7	182018	20	192182	20	202592	21	213244	21	224137	22	235266	22	246628	22	7
8	182185	22	192353	23	202767	24	213424	24	224321	25	235453	25	246819	26	8
9	182352	25	192525	26	202943	27	213604	27	224504	28	235641	28	247011	29	9
10	182520	28	192696	29	203118	29	213783	30	224688	31	235829	31	247202	32	10
11	182687	31	192868	32	203294	32	213963	33	224872	34	236016	35	247394	35	11
12	182855	34	193040	35	203470	35	214143	36	225056	37	236204	38	247585	39	12
13	183023	37	193212	37	203646	38	214323	39	225240	40	236392	41	247777	42	13
14	183191	39	193383	40	203822	41	214503	42	225424	43	236580	44	247968	45	14
15	183358	42	193555	43	203998	44	214683	45	225608	46	236768	47	248160	48	15
16	183526	45	193727	46	204174	47	214863	48	225792	49	236956	50	248352	51	16
17	183694	48	193900	49	204350	50	215043	51	225976	52	237144	54	248544	55	17
18	183862	51	194072	52	204527	53	215224	54	226160	55	237332	57	248736	58	18
19	184031	53	194244	50	204703	56	215404	57	226344	59	237520	60	248928	61	19
20	184199	56	194416	58	204879	59	215584	60	226528	62	237708	63	249120	64	20
21	184367	59	194589	61	205056	62	215765	63	226713	65	237896	66	249312	68	21
22	184535	62	194761	63	205232	65	215945	66	226897	68	238085	69	249504	71	22
23	184704	65	194934	66	205409	68	216126	69	227082	71	238273	72	249697	74	23
24	184872	68	195106	69	205585	71	216307	72	227266	74	238462	76	249889	77	24
25	185041	70	195279	72	205762	74	216487	75	227451	77	238650	79	250081	70	25
26	185209	73	195452	75	205939	77	216668	78	227636	80	238839	82	250274	84	26
27	185378	76	195624	78	206116	80	216849	81	227821	83	239028	85	250466	87	27
28	185547	79	195797	81	206293	83	217030	84	228005	86	239216	88	250659	90	28
29	185716	82	195970	84	206470	86	217211	87	228190	89	239405	91	250852	93	29
30	185884	84	196143	86	206647	88	217392	90	228375	92	239594	94	251044	96	30
31	186053	87	196316	89	206824	91	217573	94	228560	96	239783	98	251237	100	31
32	186222	90	196489	92	207001	94	217754	97	228746	99	239972	101	251430	103	32
33	186392	93	196663	95	207178	97	217935	100	228931	102	240161	104	251623	106	33
34	186561	96	196836	98	207356	100	218117	103	229116	105	240350	107	251816	109	34
35	186730	99	197009	101	207533	103	218298	106	229301	108	240539	110	252009	113	35
36	186899	101	197183	104	207710	106	218480	109	229487	111	240729	113	252202	116	36
37	187069	104	197356	107	207888	109	218661	112	229672	114	240918	117	252395	119	37
38	187238	107	197530	110	208065	112	218843	115	229858	117	241107	120	252588	122	38
39	187408	110	197703	112	208243	115	219024	118	230043	120	241297	123	252782	125	39
40	187577	113	197877	115	208421	118	219206	120	230229	123	241486	126	252975	129	40
41	187747	115	198051	118	208599	121	219388	124	230415	126	241676	129	253168	132	41
42	187916	118	198224	121	208776	124	219570	127	230600	129	241866	132	253362	135	42
43	188086	121	198398	124	208954	127	219752	130	230786	133	242055	135	253555	138	43
44	188256	124	198572	127	209132	130	219934	133	230972	136	242245	139	253749	141	44
45	188426	127	198746	130	209310	133	220116	136	231158	139	242435	142	253943	145	45
46	188596	130	198920	133	209489	136	220298	139	231344	142	242625	145	254136	148	46
47	188766	132	199094	135	209667	139	220480	142	231530	145	242815	148	254330	151	47
48	188936	135	199269	138	209845	142	220662	145	231716	148	243005	151	254524	154	48
49	189106	138	199443	141	210023	145	220844	148	231903	151	243195	154	254718	158	49
50	189277	141	199617	144	210202	147	221027	151	232089	154	243385	157	254912	161	50
51	189447	144	199792	147	210380	150	221209	154	232275	157	243575	161	255106	164	51
52	189617	146	199966	150	210559	153	221392	157	232462	160	243766	164	255300	167	52
53	189788	149	200141	153	210737	156	221574	160	232648	163	243956	167	255494	170	53
54	189958	152	200315	156	210916	159	221757	163	232835	166	244147	170	255688	174	54
55	190129	155	200490	159	211095	162	221940	166	233021	170	244337	173	255883	177	55
56	190300	158	200665	161	211273	165	222122	169	233208	173	244528	176	256077	180	56
57	190470	161	200840	164	211452	168	222305	172	233395	176	244718	180	256272	183	57
58	190641	163	201015	167	211631	171	222488	175	233582	179	244909	183	256466	187	58
59	190812	166	201189	170	211810	174	222671	178	233769	172	245100	186	256661	190	59

Natural Versed Sines.

M.	42°	Parts	43°	Parts	44°	Parts	45°	Parts	46°	Parts	47°	Parts	S.
0	256855	0	268646	0	280660	0	292893	0	305342	0	318002	0	0
1	257050	3	268845	3	280862	3	293099	3	305551	3	318214	4	1
2	257245	7	269043	7	281064	7	293305	7	305760	7	318427	7	2
3	257439	10	269242	10	281267	10	293511	10	305970	11	318640	11	3
4	257634	13	269440	13	281469	14	293716	14	306179	14	318853	14	4
5	257829	16	269639	17	281671	17	293922	17	306389	18	319066	18	5
6	258024	20	269838	20	281874	20	294128	21	306598	21	319279	21	6
7	258219	23	270037	23	282076	24	294335	24	306808	25	319492	25	7
8	258414	26	270235	27	282279	27	294541	28	307017	28	319705	29	8
9	258609	29	270434	30	282481	31	294747	31	307227	32	319919	32	9
10	258805	33	270633	33	282684	34	294953	35	307437	35	320132	36	10
11	259000	36	270832	37	282887	37	295159	38	307647	39	320345	39	11
12	259195	39	271031	40	283089	41	295366	41	307857	42	320559	43	12
13	259391	43	271231	43	283292	44	295572	45	308067	46	320772	46	13
14	259586	46	271430	47	283495	48	295779	48	308277	49	320986	50	14
15	259782	49	271629	50	283698	51	295985	52	308487	53	321199	54	15
16	259977	52	271829	53	283901	54	296192	55	308697	56	321413	57	16
17	260173	56	272028	57	284104	58	296399	59	308907	60	321627	62	17
18	260369	59	272227	60	284307	61	296605	62	309118	63	321840	64	18
19	260565	62	272427	63	284510	65	296812	66	309328	67	322054	68	19
20	260761	65	272626	67	284714	68	297019	69	309538	70	322268	71	20
21	260957	69	272826	70	284917	71	297226	73	309749	74	322482	75	21
22	261153	72	273026	73	285120	75	297433	76	309959	77	322696	79	22
23	261349	75	273225	77	285324	78	297640	80	310170	81	322910	82	23
24	261545	79	273425	80	285527	82	297847	83	310380	84	323124	86	24
25	261741	82	273625	83	285731	85	298054	86	310591	88	323338	89	25
26	261937	85	273825	87	285934	88	298261	90	310802	91	323552	93	26
27	262133	88	274025	90	286138	92	298469	93	311013	95	323767	97	27
28	262330	92	274225	93	286342	95	298676	97	311224	98	323981	100	28
29	262526	95	274425	97	286546	99	298883	100	311435	102	324195	104	29
30	262723	98	274626	100	286750	102	299091	104	311646	105	324410	107	30
31	262919	102	274826	103	286953	105	299298	107	311857	109	324624	111	31
32	263116	105	275026	107	287157	109	299506	111	312068	112	324839	114	32
33	263313	108	275227	110	287361	112	299713	114	312279	116	325053	118	33
34	263509	111	275427	113	287566	116	299921	118	312490	120	325268	122	34
35	263706	115	275628	117	287770	119	300129	121	312701	123	325483	125	35
36	263903	118	275828	120	287974	122	300337	124	312912	127	325698	129	36
37	264100	121	276029	123	288178	126	300545	128	313124	130	325912	132	37
38	264297	124	276229	127	288383	129	300752	131	313335	134	326127	136	38
39	264494	128	276430	130	288587	132	300960	135	313547	137	326342	139	39
40	264691	131	276631	133	288791	136	301168	138	313758	141	326557	143	40
41	264888	134	276832	137	288996	139	301377	142	313970	144	326772	147	41
42	265085	138	277033	140	289201	143	301585	145	314182	148	326987	150	42
43	265283	141	277234	143	289405	146	301793	149	314393	151	327203	154	43
44	265480	144	277435	147	289610	150	302001	152	314605	155	327418	157	44
45	265677	147	277636	150	289815	153	302210	156	314817	158	327633	161	45
46	265875	151	277837	153	290019	156	302418	159	315029	162	327849	164	46
47	266073	154	278038	157	290224	160	302626	163	315241	165	328064	168	47
48	266270	157	278240	160	290429	163	302835	166	315453	169	328279	172	48
49	266468	160	278441	163	290634	167	303043	169	315665	172	328495	175	49
50	266066	164	278643	167	290839	170	303252	173	315877	176	328710	179	50
51	266863	167	278844	170	291044	173	303461	176	316089	179	328926	182	51
52	267061	170	279046	173	291250	177	303670	180	316302	183	329142	186	52
53	267259	174	279247	177	291455	180	303878	183	316514	186	329358	189	53
54	267457	177	279449	180	291660	184	304087	187	316726	190	329573	193	54
55	267655	180	279651	183	291866	187	304296	190	316939	193	329789	197	55
56	267853	183	279852	187	292071	190	304505	194	317151	197	330005	200	56
57	268051	187	280054	190	292277	194	304714	197	317364	200	330221	204	57
58	268250	190	280256	193	292482	197	304923	201	317576	204	330437	207	58
59	268448	193	280458	197	292688	201	305132	204	317789	207	330653	211	59

TABLE XXV.

Natural Versed Sines.

M.	48°	Parts	49°	Parts	50°	Parts	51°	Parts	52°	Parts	53°	Parts	S.
0	330869	0	343941	0	357211	0	370680	0	384339	0	398185	0	0
1	331086	4	344161	4	357435	4	370906	4	384568	4	398417	4	1
2	331302	7	344380	7	357658	7	371132	8	384797	8	398650	8	2
3	331518	11	344600	11	357881	11	371358	11	385026	12	398882	12	3
4	331735	14	344820	15	358104	15	371584	15	385256	16	399115	16	4
5	331951	18	345039	18	358327	19	371811	19	385485	19	399347	19	5
6	332167	22	345259	22	358550	22	372037	23	385715	23	399580	23	6
7	332384	25	345479	26	358774	26	372263	27	385944	27	399812	27	7
8	332601	29	345699	29	358997	30	372490	30	386174	31	400045	31	8
9	332817	33	345919	33	359220	34	372716	34	386404	35	400278	35	9
10	333034	36	346139	37	359443	37	372943	38	386633	38	400511	39	10
11	333251	40	346359	40	359667	41	373170	42	386863	42	400744	43	11
12	333468	44	346579	44	359890	45	373396	45	387093	46	400976	47	12
13	333684	47	346800	48	360114	49	373623	49	387323	50	401209	51	13
14	333901	51	347020	52	360337	52	373850	53	387553	54	401442	54	14
15	334118	54	347240	55	360561	56	374077	57	387783	58	401675	58	15
16	334335	56	347461	59	360785	60	374303	61	388013	61	401908	62	16
17	334552	62	347681	63	361008	64	374530	64	388243	65	402142	66	17
18	334770	65	347902	66	361232	67	374757	68	388473	69	402375	70	18
19	334987	69	348122	70	361456	71	374984	72	388703	73	402608	74	19
20	335204	73	348343	74	361680	75	375211	76	388933	77	402841	78	20
21	335421	76	348563	77	361904	79	375439	80	389164	81	403075	82	21
22	335639	80	348784	81	362128	82	375666	83	389394	84	403308	86	22
23	335856	84	349005	85	362352	86	375893	87	389624	88	403542	89	23
24	336074	87	349226	88	362576	90	376120	91	389855	92	403775	93	24
25	336291	91	349447	92	362800	94	376348	95	390085	96	404009	97	25
26	336509	94	349668	96	363024	97	376575	99	390316	100	404242	101	26
27	336727	98	349889	99	363249	101	376803	102	390546	104	404476	105	27
28	336944	102	350110	103	363473	105	377030	106	390777	108	404710	109	28
29	337162	105	350331	107	363697	109	377258	110	391008	111	404943	113	29
30	337380	109	350552	110	363922	112	377485	114	391239	115	405177	117	30
31	337598	113	350773	114	364146	116	377713	118	391469	119	405411	121	31
32	337816	116	350994	118	364371	120	377941	121	391700	123	405645	125	32
33	338034	120	351216	122	364595	123	378169	125	391931	127	405879	128	33
34	338252	123	351437	125	364820	127	378396	129	392162	131	406113	132	34
35	338470	127	351659	129	365045	131	378624	133	392393	134	406347	136	35
36	338688	131	351880	133	365269	135	378852	136	392624	138	406581	140	36
37	338906	134	352102	136	365494	138	379080	140	392855	142	406815	144	37
38	339125	138	352323	140	365719	142	379308	144	393086	146	407049	148	38
39	339343	142	352545	144	365944	146	379536	148	393318	150	407284	152	39
40	339561	145	352767	147	366169	150	379765	152	393549	154	407518	156	40
41	339780	149	352988	151	366394	153	379993	155	393780	158	407752	160	41
42	339998	153	353210	155	366619	157	380221	159	394012	161	407987	163	42
43	340217	156	353432	158	366844	161	380449	163	394243	165	408221	167	43
44	340435	160	353654	162	367069	165	380678	167	394474	169	408456	171	44
45	340654	163	353876	166	367295	168	380906	171	394706	173	408690	175	45
46	340873	167	354098	169	367520	172	381135	174	394938	177	408925	179	46
47	341092	171	354320	173	367745	176	381363	178	395169	181	409160	183	47
48	341311	174	354542	177	367971	180	381592	182	395401	184	409394	187	48
49	341530	178	354764	180	368196	183	381820	186	395633	188	409629	191	49
50	341749	182	354987	184	368422	187	382049	190	395864	192	409864	195	50
51	341968	185	355209	188	368647	191	382278	193	396096	196	410099	198	51
52	342187	189	355431	191	368873	195	382506	197	396328	200	410334	202	52
53	342406	193	355654	195	369098	198	382735	201	396560	204	410569	206	53
54	342625	196	355876	199	369324	202	382964	205	396792	207	410804	210	54
55	342844	200	356099	203	369550	206	383193	209	397024	211	411039	214	55
56	343063	203	356321	206	369776	210	383422	212	397256	215	411274	218	56
57	343283	207	356544	210	370002	213	383651	216	397488	219	411509	222	57
58	343502	211	356767	214	370228	217	383880	220	397720	223	411741	226	58
59	343721	214	356989	217	370454	221	384109	224	397953	227	411979	230	59

TABLE XXV.

Natural Versed Sines.

M.	54°	Parts	55°	Parts	56°	Parts	57°	Parts	58°	Parts	59°	Parts	S.
0	412215	0	426424	0	440807	0	455361	0	470081	0	484962	0	0
1	412450	4	426662	4	441048	4	455605	4	470327	4	485211	4	1
2	412686	8	426900	8	441290	8	455849	8	470574	8	485461	8	2
3	412921	12	427139	12	441531	12	456093	12	470821	12	485710	13	3
4	413156	16	427377	16	441772	16	456337	16	471068	16	485960	17	4
5	413392	20	427616	20	442013	20	456581	20	471315	21	486209	21	5
6	413628	24	427854	24	442255	24	456826	25	471562	25	486459	25	6
7	413863	28	428093	28	442496	28	457070	29	471809	29	486708	29	7
8	414099	32	428331	32	442738	32	457314	33	472056	33	486958	33	8
9	414335	35	428570	36	442979	36	457558	37	472303	37	487208	38	9
10	414571	39	428809	40	443221	40	457803	41	472550	41	487457	42	10
11	414806	43	429048	44	443463	44	458047	45	472797	45	487707	46	11
12	415042	47	429286	48	443704	48	458292	49	473044	49	487957	50	12
13	415278	51	429525	52	443946	53	458536	53	473291	54	488207	54	13
14	415514	55	429764	56	444188	57	458781	57	473539	58	488457	58	14
15	415750	59	430003	60	444430	61	459026	61	473786	62	488707	63	15
16	415986	63	430242	64	444672	65	459270	65	474033	66	488957	67	16
17	416223	67	430481	68	444914	69	459515	70	474281	70	489207	71	17
18	416459	71	430720	72	445156	73	459760	74	474528	74	489457	75	18
19	416695	75	430960	76	445398	77	460004	78	474776	78	489707	79	19
20	416931	79	431199	80	445640	81	460249	82	475023	82	489957	83	20
21	417168	83	431438	84	445882	85	460494	86	475271	87	490208	88	21
22	417404	87	431677	88	446124	89	460739	90	475519	91	490458	92	22
23	417641	91	431917	92	446366	93	460984	94	475766	95	490708	96	23
24	417877	95	432156	96	446608	97	461229	98	476014	99	490959	100	24
25	418114	99	432396	100	446851	101	461474	102	476262	103	491209	104	25
26	418350	102	432635	104	447093	105	461719	106	476510	107	491459	109	26
27	418587	106	432875	108	447336	109	461965	100	476758	111	491710	113	27
28	418824	110	433114	112	447578	113	462210	115	477005	115	491960	117	28
29	419060	114	433354	116	447820	117	462455	119	477253	120	492211	121	29
30	419297	118	433594	120	448063	121	462700	123	477501	124	492462	125	30
31	419534	122	433834	124	448306	125	462946	127	477749	128	492712	129	31
32	419771	126	434073	128	448548	129	463191	131	477998	132	492963	134	32
33	420008	130	434313	132	448791	133	463437	135	478246	136	493214	138	33
34	420245	134	434553	136	449034	137	463682	139	478494	140	493465	142	34
35	420482	138	434793	140	449276	141	463928	143	478742	144	493715	146	35
36	420719	142	435033	144	449519	145	464173	147	478990	148	493966	150	36
37	420956	146	435273	148	449762	150	464419	151	479239	153	494217	154	37
38	421193	150	435513	152	450005	154	464665	155	479487	157	494468	159	38
39	421430	154	435753	156	450248	158	464910	160	479735	161	494719	163	39
40	421668	158	435993	160	450491	162	465156	164	479984	165	494970	167	40
41	421905	162	436234	164	450734	166	465402	168	480232	169	495221	171	41
42	422142	166	436474	168	450977	170	465648	172	480481	173	495472	175	42
43	422380	169	436714	172	451220	174	465894	176	480729	177	495724	180	43
44	422617	173	436955	176	451464	178	466139	180	480978	181	495975	184	44
45	422855	177	437195	180	451707	182	466385	184	481227	186	496226	188	45
46	423092	181	437435	184	451950	186	466632	188	481475	190	496477	192	46
47	423330	185	437676	188	452193	190	466878	192	481724	194	496729	196	47
48	423568	189	437917	192	452437	194	467124	196	481973	198	496980	200	48
49	423805	193	438157	196	452680	198	467370	200	482222	202	497231	205	49
50	424043	197	438398	200	452924	202	467616	205	482471	206	497483	209	50
51	424281	201	438639	204	453167	206	467862	209	482720	210	497734	213	51
52	424519	205	438879	208	453411	210	468109	213	482969	214	497986	217	52
53	424757	209	439120	212	453654	214	468355	217	483218	219	498238	221	53
54	424995	213	439361	216	453898	218	468601	221	183467	223	498489	225	54
55	425233	217	439602	220	454142	222	468848	225	483716	227	498741	230	55
56	425471	221	439843	224	454385	226	469094	229	483965	231	498993	234	56
57	425709	225	440084	228	454629	230	469341	233	484214	235	499244	238	57
58	425947	229	440325	231	454873	234	469587	237	484463	239	499496	242	58
59	426185	233	440566	235	455117	238	469834	241	484713	243	499748	246	59

TABLE XXV.

Natural Versed Sines.

M.	60°	Parts	61°	Parts	62°	Parts	63°	Parts	64°	Parts	65°	Parts	S.
0	500000	0	515190	0	530528	0	546010	0	561629	0	577382	0	0
1	500252	4	515445	4	530785	4	546269	4	561890	4	577645	4	1
2	500504	8	515699	8	531042	9	546528	9	562152	9	577909	9	2
3	500756	13	515954	13	531299	13	546787	13	562413	13	578173	13	3
4	501008	17	516208	17	531556	17	547047	17	562675	17	578437	18	4
5	501260	21	516463	21	531813	21	547306	22	562937	22	578700	22	5
6	501512	25	516718	26	532070	26	547565	26	563198	26	578964	26	6
7	501764	30	516972	30	532327	30	547825	30	563460	31	579228	31	7
8	502017	34	517227	34	532584	34	548084	35	563722	35	579492	35	8
9	502269	38	517482	38	532842	39	548344	39	563983	39	579756	40	9
10	502521	42	517737	43	533099	43	548603	43	564245	44	580020	44	10
11	502774	46	517991	47	533356	47	548863	48	564507	48	580284	49	11
12	503026	51	518246	51	533613	52	549122	52	564769	52	580548	53	12
13	503278	55	518501	55	533871	56	549382	56	565031	57	580812	57	13
14	503531	59	518756	60	534128	60	549642	61	565293	61	581076	62	14
15	503783	63	519011	64	534385	64	549902	65	565555	66	581340	66	15
16	504036	68	519266	68	534642	69	550161	69	565817	70	581604	71	16
17	504289	72	519521	72	534900	73	550421	74	566079	74	581869	75	17
18	504541	76	519777	77	535158	77	550681	78	566341	79	582133	79	18
19	504794	80	520032	81	535416	82	550941	82	566603	83	582397	84	19
20	505047	84	520287	85	535673	86	551201	87	566865	87	582662	88	20
21	505300	89	520542	89	535931	90	551461	91	567127	92	582926	93	21
22	505552	93	520797	94	536188	95	551721	95	567390	96	583190	97	22
23	505805	97	521053	98	536446	99	551981	100	567652	101	583455	102	23
24	506058	101	521308	102	536704	103	552241	104	567914	105	583719	106	24
25	506311	106	521564	106	536962	107	552501	109	568177	109	583984	110	25
26	506564	110	521819	111	537220	112	552761	113	568439	114	584248	115	26
27	506817	114	522075	115	537477	116	553021	117	568701	118	584513	119	27
28	507070	118	522330	119	537735	120	553282	122	568964	122	584777	124	28
29	507323	123	522586	123	537993	125	553542	126	569226	127	585042	128	29
30	507576	127	522841	128	538251	129	553802	130	569489	131	585307	132	30
31	507830	131	523097	132	538509	133	554063	135	569751	136	585571	137	31
32	508083	135	523353	136	538768	138	554323	139	570014	140	585836	141	32
33	508336	139	523608	141	539026	142	554583	143	570277	144	586101	146	33
34	508589	144	523864	145	539284	146	554844	148	570539	149	586366	150	34
35	508843	148	524120	149	539542	150	555104	152	570802	153	586631	155	35
36	509096	152	524376	153	539800	155	555365	156	571065	157	586896	159	36
37	509350	156	524632	158	540058	159	555625	161	571328	162	587160	163	37
38	509603	161	524888	162	540317	163	555886	165	571590	166	587425	168	38
39	509857	165	525144	166	540575	168	556147	169	571853	171	587690	172	39
40	510110	169	525400	170	540834	172	556407	174	572116	175	587955	177	40
41	510364	173	525656	175	541092	176	556668	178	572379	179	588221	181	41
42	510618	177	525912	179	541350	181	556929	182	572642	184	588486	189	42
43	510871	182	526168	183	541609	185	557190	187	572905	188	588751	190	43
44	511125	186	526424	187	541867	189	557450	191	573168	192	589016	194	44
45	511379	190	526680	192	542126	193	557711	195	573431	197	589281	199	45
46	511633	194	526937	196	542385	198	557972	200	573694	202	589546	203	46
47	511886	199	527193	200	542643	202	558233	204	573958	206	589812	208	47
48	512140	203	527449	204	542902	206	558494	208	574221	210	590077	212	48
49	512394	207	527706	209	543161	211	558755	213	574484	214	590342	216	49
50	512648	211	527962	213	543420	215	559016	217	574747	219	590608	221	50
51	512902	215	528218	217	543678	219	559277	221	575010	223	590873	225	51
52	513156	220	528475	221	543937	224	559538	226	575274	227	591139	230	52
53	513410	224	528732	226	544196	228	559800	230	575537	232	591404	234	53
54	513665	228	528988	230	544455	232	560061	234	575801	236	591670	238	54
55	513919	232	529245	234	544714	236	560322	239	576064	241	591935	243	55
56	514173	237	529501	238	544973	241	560583	243	576327	245	592201	247	56
57	514427	241	529758	243	545232	245	560845	247	576591	249	592466	252	57
58	514682	245	530015	247	545491	249	561106	252	576855	254	592732	256	58
59	514936	249	530272	251	545750	254	561367	256	577118	258	592998	260	59

Natural Versed Sines.

M.	66°	Parts	67°	Parts	68°	Parts	69°	Parts	70°	Parts	71°	Parts	S.
0	593263	0	609269	0	625393	0	641632	0	657986	0	674423	0	0
1	593529	4	609537	4	625663	5	641904	5	658253	5	674707	5	1
2	593795	9	609804	9	625933	9	642175	9	658527	9	674982	9	2
3	594061	13	610072	13	626203	14	642447	14	658800	14	675257	14	3
4	594327	18	610340	18	626472	18	642719	18	659073	18	675532	18	4
5	594592	22	610608	22	626742	23	642990	23	659347	23	675807	23	5
6	594858	27	610876	27	627012	27	643262	27	659620	27	676083	28	6
7	595124	31	611144	31	627282	32	643534	32	659894	32	676358	32	7
8	595390	36	611412	36	627552	36	643806	36	660168	36	676633	37	8
9	595656	40	611680	40	627822	41	644077	41	660441	41	676908	41	9
10	595922	44	611948	45	628092	45	644349	45	660715	46	677184	46	10
11	596189	49	612216	49	628362	50	644621	50	660988	50	677459	51	11
12	596455	53	612484	54	628632	54	644893	54	661262	55	677734	55	12
13	596721	58	612753	58	628902	59	645165	59	661536	59	678010	60	13
14	596987	62	613021	63	629172	63	645437	64	661810	64	678285	64	14
15	597253	67	613289	67	629443	68	645709	68	662083	68	678561	69	15
16	597520	71	613557	72	629713	72	645981	73	662357	73	678836	74	16
17	597786	76	613826	76	629983	77	646253	77	662631	78	679111	78	17
18	598052	80	614094	81	630253	81	646525	82	662905	82	679387	83	18
19	598319	85	614362	85	630524	86	646797	86	663179	87	679663	87	19
20	598585	89	614631	90	630794	90	647069	91	663453	91	679938	92	20
21	598851	93	614899	94	631064	95	647342	95	663726	96	680214	97	21
22	599118	98	615168	99	631335	99	647614	100	664000	100	680489	101	22
23	599384	102	615436	103	631605	104	647886	104	664274	105	680765	106	23
24	599651	107	615705	108	631875	108	648159	109	664548	110	681041	110	24
25	599918	111	615973	112	632146	113	648431	114	664822	114	681316	115	25
26	600184	116	616242	117	632416	117	648703	118	665097	119	681592	120	26
27	600451	120	616510	121	632687	122	648975	123	665371	123	681868	124	27
28	600717	125	616779	125	632958	126	649248	127	665645	128	682144	129	28
29	600984	129	617048	130	633228	131	649520	132	665919	132	682420	133	29
30	601251	133	617317	134	633499	135	649793	136	666193	137	682695	138	30
31	601518	138	617585	139	633769	140	650065	141	666467	142	682971	143	31
32	601785	142	617854	143	634040	144	650338	145	666742	146	683247	147	32
33	602051	147	618123	148	634311	149	650610	150	667016	151	683523	152	33
34	602318	151	618392	152	634582	153	650883	154	667290	155	683799	156	34
35	602585	156	618661	157	634852	158	651155	159	667565	160	684075	161	35
36	602852	160	618930	161	635123	162	651428	163	667839	164	684351	166	36
37	603119	165	619199	166	635394	167	651701	168	668113	169	684627	170	37
38	603386	169	619468	170	635665	171	651973	173	668388	173	684903	175	38
39	603653	174	619737	175	635936	176	652246	177	668662	178	685179	179	39
40	603920	178	620006	179	636207	180	652519	182	668937	183	685455	184	40
41	604187	182	620275	184	636478	185	652792	186	669211	187	685731	189	41
42	604454	187	620544	188	636749	189	653064	191	669486	192	686008	193	42
43	604722	191	620813	193	637020	194	653337	195	669760	196	686284	198	43
44	604989	196	621082	197	637291	198	653610	200	670035	201	686560	202	44
45	605256	200	621351	202	637562	203	653883	204	670309	205	686836	207	45
46	605523	205	621621	206	637833	207	654156	209	670584	210	687112	212	46
47	605791	209	621890	211	638104	212	654429	213	670859	215	687389	216	47
48	606058	214	622159	215	638375	216	654702	218	671133	219	687665	221	48
49	606325	218	622429	220	638647	221	654975	223	671408	224	687941	225	49
50	606593	222	622698	224	638918	225	655248	227	671683	228	688218	230	50
51	606860	227	622968	229	639189	230	655521	232	671958	233	688494	235	51
52	607128	231	623237	233	639460	234	655794	236	672232	237	688771	239	52
53	607395	236	623506	238	639732	239	656067	241	672507	242	689047	244	53
54	607663	240	623776	242	640003	243	656340	245	672782	247	689324	248	54
55	607930	245	624045	247	640275	248	656613	250	673057	251	689600	253	55
56	608198	249	624315	251	640546	252	656887	254	673332	256	689877	258	56
57	608466	254	624584	256	640817	257	657160	259	673607	260	690153	262	57
58	608733	258	624854	260	641089	261	657433	263	673882	265	690430	267	58
59	609001	262	625124	264	641360	266	657707	268	674157	269	690706	271	59

TABLE XXV.

Natural Versed Sines.

M.	72°	Parts	73°	Parts	74°	Parts	75°	Parts	76°	Parts	77°	Parts	S.
0	690983	0	707628	0	724363	0	741181	0	758078	0	775049	0	0
1	691260	5	707906	5	724642	5	741462	5	758360	5	775332	5	1
2	691536	9	708185	9	724922	9	741743	9	758643	9	775616	9	2
3	691813	14	708463	14	725202	14	742024	14	758925	14	775899	14	3
4	692090	18	708741	19	725481	19	742305	19	759207	19	776183	19	4
5	692367	23	709019	23	725761	23	742586	23	759490	24	776466	24	5
6	692643	28	709298	28	726041	28	742867	28	759772	28	776750	28	6
7	692920	32	709576	33	726321	33	743148	33	760054	33	777033	33	7
8	693197	37	709855	37	726600	37	743429	38	760337	38	777317	38	8
9	693474	42	710133	42	726880	42	743711	42	760619	42	777601	43	9
10	693751	46	710411	46	727160	47	743992	47	760902	47	777884	47	10
11	694028	51	710690	51	727440	51	744273	52	761184	52	778168	52	11
12	694305	55	710968	56	727720	56	744554	56	761467	57	778452	57	12
13	694582	60	711247	60	728000	61	744835	61	761749	61	778735	61	13
14	694859	65	711525	65	728280	65	745117	66	762032	66	779019	66	14
15	695136	69	711804	70	728560	70	745398	70	762314	71	779303	71	15
16	695413	74	712082	74	728840	75	745679	75	762597	75	779587	76	16
17	695690	78	712361	79	729120	79	745961	80	762879	80	779870	80	17
18	695967	83	712639	84	729400	84	746242	85	763162	85	780154	85	18
19	696244	88	712918	88	729680	89	746523	89	763444	90	780438	90	19
20	696521	92	713197	93	729960	93	746805	94	763727	94	780721	95	20
21	696798	97	713475	98	730240	98	747086	99	764010	99	781005	99	21
22	697076	102	713754	102	730520	103	747368	103	764292	104	781289	104	22
23	697353	106	714033	107	730800	107	747649	108	764575	108	781573	109	23
24	697630	111	714312	112	731080	112	747931	113	764858	113	781857	114	24
25	697907	115	714590	116	731360	117	748212	117	765141	118	782141	118	25
26	698185	120	714869	121	731641	121	748494	122	765423	123	782425	123	26
27	698462	125	715148	126	731921	126	748775	127	765706	127	782708	128	27
28	698739	129	715427	130	732201	131	749057	132	765989	132	782992	132	28
29	699017	134	715706	135	732481	135	749338	136	766272	137	783276	137	29
30	699294	138	715985	139	732762	140	749620	141	766555	141	783560	142	30
31	699572	143	716264	144	733042	145	749902	146	766837	146	783844	147	31
32	699849	148	716543	149	733322	149	750183	150	767120	151	784128	151	32
33	700127	152	716822	153	733603	154	750465	155	767403	156	784412	156	33
34	700404	157	717101	158	733883	159	750747	160	767686	160	784697	161	34
35	700682	162	717380	163	734163	163	751028	164	767969	165	784981	166	35
36	700959	166	717659	167	734444	168	751310	169	768252	170	785265	170	36
37	701237	171	717938	172	734724	173	751592	174	768535	174	785549	175	37
38	701514	175	718217	177	735005	177	751874	179	768818	179	785833	180	38
39	701792	180	718496	181	735285	182	752155	183	769101	184	786117	185	39
40	702070	185	718775	186	735566	187	752437	188	769384	189	786401	189	40
41	702347	189	719054	191	735846	191	752719	193	769667	193	786685	194	41
42	702625	194	719333	195	736127	196	753001	197	769950	198	786970	199	42
43	702903	198	719612	200	736408	201	753283	202	770233	203	787254	203	43
44	703181	203	719892	205	736688	205	753565	207	770516	207	787538	208	44
45	703458	208	720171	209	736969	210	753847	211	770800	212	787822	213	45
46	703736	212	720450	214	737249	215	754129	216	771083	217	788107	218	46
47	704014	217	720730	219	737530	219	754411	221	771366	222	788391	222	47
48	704292	222	721009	223	737811	224	754693	226	771649	226	788675	227	48
49	704570	226	721288	228	738092	229	754975	230	771932	231	788960	232	49
50	704848	231	721568	232	738372	233	755257	235	772216	236	789244	237	50
51	705126	235	721847	237	738653	238	755539	240	772499	241	789528	241	51
52	705404	240	722126	242	738934	243	755821	244	772782	245	789813	246	52
53	705682	245	722406	246	739215	247	756103	249	773065	250	790097	251	53
54	705960	249	722685	251	739495	252	756385	254	773349	255	790381	256	54
55	706238	254	722965	256	739776	257	756667	258	773632	259	790666	260	55
56	706516	258	723244	260	740057	261	756949	263	773915	264	790950	265	56
57	706794	263	723524	265	740338	266	757231	268	774199	269	791235	270	57
58	707072	268	723803	270	740619	271	757514	273	774482	274	791519	274	58
59	707350	272	724083	274	740900	275	757796	277	774766	278	791804	279	59

Natural Versed Sines.

M.	78°	Parts	79°	Parts	80°	Parts	81°	Parts	82°	Parts	83°	Parts	S.
0	792088	0	809191	0	826352	0	843566	0	860827	0	878131	0	0
1	792373	5	809477	5	826638	5	843853	5	861115	5	878419	5	1
2	792657	9	809762	9	826925	10	844140	10	861403	10	878708	10	2
3	792942	14	810048	14	827211	14	844428	14	861691	14	878997	14	3
4	793227	19	810333	19	827498	19	844715	19	861979	19	879286	19	4
5	793511	24	810619	24	827784	24	845002	24	862267	24	879574	24	5
6	793796	28	810905	29	828071	29	845290	29	862555	29	879863	29	6
7	794080	33	811190	33	828357	33	845577	34	862844	34	880152	34	7
8	794365	38	811476	38	828644	38	845864	38	863132	38	880441	38	8
9	794650	43	811762	43	828931	43	846152	43	863420	43	880730	43	9
10	794935	47	812047	48	829217	48	846439	48	863708	48	881018	48	10
11	795219	52	812333	52	829504	53	846727	53	863996	53	881307	53	11
12	795504	57	812619	57	829791	57	847014	57	864284	58	881596	58	12
13	795789	62	812904	62	830077	62	847302	62	864573	62	881885	63	13
14	796073	66	813190	67	830364	67	847589	67	864861	67	882174	67	14
15	796358	71	813476	71	830650	72	847877	72	865149	72	882463	72	15
16	796643	76	813762	76	830937	76	848164	77	865437	77	882751	77	16
17	796928	81	814048	81	831224	81	848452	81	865726	82	883040	82	17
18	797213	85	814333	86	831511	86	848739	86	866014	87	883329	87	18
19	797498	90	814619	91	831797	91	849027	91	866302	91	883618	91	19
20	797782	95	814905	95	832084	96	849314	96	866590	96	883907	96	20
21	798067	100	815191	100	832371	100	849602	101	866879	101	884196	101	21
22	798352	104	815477	105	832658	105	849889	105	867167	106	884485	106	22
23	798637	109	815763	110	832944	110	850177	110	867455	111	884774	111	23
24	798922	114	816049	114	833231	115	850465	115	867744	115	885063	116	24
25	799207	119	816335	119	833518	120	850753	120	868032	120	885352	120	25
26	799492	123	816621	124	833805	124	851040	125	868320	125	885641	125	26
27	799777	128	816906	129	834092	129	851328	129	868609	130	885930	130	27
28	800062	133	817192	133	834379	134	851615	134	868897	135	886219	135	28
29	800347	138	817478	138	834666	139	851903	139	869185	139	886508	140	29
30	800632	142	817764	143	834952	143	852191	144	869474	144	886797	144	30
31	800917	147	818050	148	835239	148	852478	149	869762	149	887086	149	31
32	801202	152	818337	152	835526	153	852766	153	870051	154	887375	154	32
33	801487	157	818623	157	835813	158	853054	158	870339	159	887664	159	33
34	801772	161	818909	162	836100	163	853341	163	870627	163	887953	164	34
35	802058	166	819195	167	836387	167	853629	168	870916	168	888242	169	35
36	802343	171	819481	172	836674	172	853917	172	871204	173	888531	173	36
37	802628	176	819767	176	836961	177	854205	177	871493	178	888820	178	37
38	802913	180	820053	181	837248	182	854493	182	871781	183	889109	183	38
39	803198	185	820339	186	837535	187	854780	187	872070	188	889398	188	39
40	803483	190	820625	191	837822	191	855068	192	872358	192	889687	193	40
41	803769	195	820912	195	838109	196	855356	196	872647	197	889977	197	41
42	804054	199	821198	200	838396	201	855644	201	872935	202	890266	202	42
43	804339	204	821484	205	838683	206	855932	206	873224	207	890555	207	43
44	804624	209	821770	210	838970	210	856220	211	873512	212	890844	212	44
45	804910	214	822056	214	839257	215	856507	216	873801	216	891133	217	45
46	805195	218	822343	219	839545	220	856795	220	874090	221	891422	222	46
47	805480	223	822629	224	839832	225	857083	225	874378	226	891711	226	47
48	805766	228	822915	229	840119	230	857371	230	874667	231	892000	231	48
49	806051	233	823202	234	840406	234	857659	235	874955	236	892290	236	49
50	806336	237	823488	238	840693	239	857947	240	875244	240	892579	241	50
51	806622	242	823774	243	840980	244	858235	244	875533	245	892868	246	51
52	806907	247	824061	248	841268	249	858523	249	875821	250	893157	250	52
53	807193	252	824347	253	841555	253	858811	254	876110	255	893447	255	53
54	807478	256	824633	257	841842	258	859099	259	876399	260	893736	260	54
55	807763	261	824920	262	842129	263	859387	264	876687	264	894025	265	55
56	808049	266	825206	267	842416	268	859675	268	876976	269	894314	270	56
57	808334	271	825492	272	842704	273	859963	273	877265	274	894604	275	57
58	808620	275	825779	276	842991	277	860251	278	877553	279	894893	279	58
59	808905	280	826065	281	843278	282	860539	283	877842	284	895182	284	59

TABLE XXV.

Natural Versed Sines.

M.	84°	Parts	85°	Parts	86°	Parts	87°	Parts	88°	Parts	89°	Parts	S.
0	895472	0	912844	0	930244	0	947664	0	965101	0	982548	0	0
1	895761	5	913134	5	930534	5	947955	5	965391	5	982838	5	1
2	896050	10	913424	10	930824	10	948245	10	965682	10	983129	10	2
3	896339	14	913714	14	931114	15	948536	15	965973	15	983420	15	3
4	896629	19	914003	19	931404	19	948826	19	966263	19	983711	19	4
5	896918	24	914293	24	931694	24	949117	24	966554	24	984002	24	5
6	897207	29	914583	29	931985	29	949407	29	966845	29	984293	29	6
7	897497	34	914873	34	932275	34	949698	34	967136	34	984584	34	7
8	897786	39	915163	39	932565	39	949988	39	967426	39	984874	39	8
9	898076	43	915453	43	932855	44	950279	44	967717	44	985165	44	9
10	898365	48	915742	48	933146	48	950569	48	968008	48	985456	48	10
11	898654	53	916032	53	933436	53	950860	53	968298	53	985747	53	11
12	898944	58	916322	58	933726	58	951150	58	968589	58	986038	58	12
13	899233	63	916612	63	934016	63	951441	63	968880	63	986329	63	13
14	899523	68	916902	68	934307	68	951731	68	969171	68	986620	68	14
15	899812	72	917192	72	934597	73	952022	73	969461	73	986910	73	15
16	900101	77	917482	77	934887	77	952312	77	969752	77	987201	77	16
17	900391	82	917772	82	935177	82	952603	82	970043	82	987492	82	17
18	900680	87	918061	87	935468	87	952894	87	970334	87	987783	87	18
19	900970	92	918351	92	935758	92	953184	92	970625	92	988074	92	19
20	901259	96	918641	97	936048	97	953475	97	970915	97	988365	97	20
21	901549	101	918931	101	936339	102	953765	102	971206	102	988656	102	21
22	901838	106	919221	106	936629	106	954056	106	971497	106	988946	106	22
23	902128	111	919511	111	936919	111	954346	111	971788	111	989237	111	23
24	902417	116	919801	116	937209	116	954637	116	972078	116	989528	116	24
25	902707	121	920091	121	937500	121	954928	121	972369	121	989819	121	25
26	902996	125	920381	126	937790	126	955218	126	972660	126	990110	126	26
27	903286	130	920671	130	938080	131	955509	131	972951	131	990401	131	27
28	903575	135	920961	135	938371	136	955799	136	973241	136	990692	136	28
29	903865	140	921251	140	938661	140	956090	140	973532	140	990983	140	29
30	904154	145	921541	145	938951	145	956381	145	973823	145	991273	145	30
31	904444	150	921831	150	939242	150	956671	150	974114	150	991564	150	31
32	904733	154	922121	155	939532	155	956962	155	974405	155	991855	155	32
33	905023	159	922411	159	939823	160	957252	160	974695	160	992146	160	33
34	905313	164	922701	164	940113	165	957543	165	974986	165	992437	165	34
35	905602	169	922991	169	940403	169	957834	169	975277	169	992728	169	35
36	905892	174	923281	174	940694	174	958124	174	975568	174	993019	174	36
37	906181	178	923571	179	940984	179	958415	179	975859	179	993310	179	37
38	906471	183	923861	184	941274	184	958706	184	976149	184	993601	184	38
39	906761	188	924151	188	941565	189	958996	189	976440	189	993891	189	39
40	907050	193	924441	193	941855	194	959287	194	976731	194	994182	194	40
41	907340	198	924731	198	942146	199	959578	199	977022	199	994473	199	41
42	907629	203	925021	203	942436	203	959868	203	977313	203	994764	203	42
43	907919	207	925311	208	942726	208	960159	208	977603	208	995055	208	43
44	908209	212	925601	213	943017	213	960450	213	977894	213	995346	213	44
45	908498	217	925892	217	943307	218	960740	218	978185	218	995637	218	45
46	908788	222	926182	222	943598	223	961031	223	978476	223	995928	223	46
47	909078	227	926472	227	943888	228	961322	228	978767	228	996218	228	47
48	909367	232	926762	232	944178	232	961612	232	979058	232	996509	232	48
49	909657	236	927052	237	944469	237	961903	237	979348	237	996800	237	49
50	909947	241	927342	242	944759	242	962194	242	979639	242	997091	242	50
51	910237	246	927632	246	945050	247	962484	247	979930	247	997382	247	51
52	910526	251	927922	251	945340	252	962775	252	980221	252	997673	252	52
53	910816	256	928212	256	945631	257	963066	257	980512	257	997964	257	53
54	911106	261	928503	261	945921	261	963356	261	980803	261	998255	261	54
55	911395	265	928793	266	946212	266	963647	266	981093	266	998546	266	55
56	911685	270	929083	271	946502	271	963937	271	981384	271	998836	271	56
57	911975	275	929373	275	946793	276	964228	276	981675	276	999127	276	57
58	912265	280	929663	280	947083	281	964519	281	981966	281	999418	281	58
59	912554	285	929953	285	947374	286	964810	286	982257	286	999709	286	59

TABLE XXV.

Natural Versed Sines.

M.	90°	Parts	91°	Parts	92°	Parts	93°	Parts	94°	Parts	95°	Parts	S.
0	1000000	0	1017452	0	1034899	0	1052336	0	1069756	0	1087156	0	0
1	1000291	5	1017743	5	1035190	5	1052626	5	1070047	5	1087446	5	1
2	1000582	10	1018034	10	1035481	10	1052917	10	1070337	10	1087735	10	2
3	1000873	15	1018325	15	1035772	15	1053207	15	1070627	14	1088025	14	3
4	1001164	19	1018616	19	1036062	19	1053498	19	1070917	19	1088315	19	4
5	1001454	24	1018907	24	1036353	24	1053788	24	1071207	24	1088605	24	5
6	1001745	29	1019197	29	1036644	29	1054079	29	1071497	29	1088894	29	6
7	1002036	34	1019488	34	1036934	34	1054369	34	1071788	34	1089184	34	7
8	1002327	39	1019779	39	1037225	39	1054660	39	1072078	39	1089474	39	8
9	1002618	44	1020070	44	1037516	44	1054950	44	1072368	43	1089763	43	9
10	1002909	48	1020361	48	1037806	48	1055241	48	1072658	48	1090053	48	10
11	1003200	53	1020652	53	1038097	53	1055531	53	1072948	53	1090343	53	11
12	1003491	58	1020942	58	1038388	58	1055822	58	1073238	58	1090633	58	12
13	1003782	63	1021233	63	1038678	63	1056112	63	1073528	63	1090922	63	13
14	1004072	68	1021524	68	1038969	68	1056402	68	1073818	68	1091212	68	14
15	1004363	73	1021815	73	1039260	73	1056693	73	1074108	72	1091502	72	15
16	1004654	77	1022106	77	1039550	77	1056983	77	1074399	77	1091791	77	16
17	1004945	82	1022397	82	1039841	82	1057274	82	1074689	82	1092081	82	17
18	1005236	87	1022687	87	1040132	87	1057564	87	1074979	87	1092371	87	18
19	1005527	92	1022978	92	1040422	92	1057854	92	1075269	92	1092660	92	19
20	1005818	97	1023269	97	1040713	97	1058145	97	1075559	97	1092950	96	20
21	1006109	102	1023560	102	1041004	102	1058435	102	1075849	101	1093239	101	21
22	1006399	106	1023851	106	1041294	106	1058726	106	1076139	106	1093529	106	22
23	1006690	111	1024141	111	1041585	111	1059016	111	1076429	111	1093819	111	23
24	1006981	116	1024432	116	1041876	116	1059306	116	1076719	116	1094108	116	24
25	1007272	121	1024723	121	1042166	121	1059597	121	1077009	121	1094398	121	25
26	1007563	126	1025014	126	1042457	126	1059887	126	1077299	126	1094687	125	26
27	1007854	131	1025305	131	1042748	131	1060177	131	1077589	130	1094977	130	27
28	1008145	136	1025595	136	1043038	136	1060468	136	1077879	135	1095267	135	28
29	1008436	140	1025886	140	1043329	140	1060758	140	1078169	140	1095556	140	29
30	1008727	145	1026177	145	1043619	145	1061049	145	1078459	145	1095846	145	30
31	1009017	150	1026468	150	1043910	150	1061339	150	1078749	150	1096135	150	31
32	1009308	155	1026759	155	1044201	155	1061629	155	1079039	155	1096425	154	32
33	1009599	160	1027049	160	1044491	160	1061920	160	1079329	159	1096714	159	33
34	1009890	165	1027340	165	1044782	165	1062210	165	1079619	164	1097004	164	34
35	1010181	169	1027631	169	1045072	169	1062500	169	1079909	169	1097293	169	35
36	1010472	174	1027922	174	1045363	174	1062791	174	1080199	174	1097583	174	36
37	1010763	179	1028213	179	1045654	179	1063081	179	1080489	179	1097872	178	37
38	1011054	184	1028503	184	1045944	184	1063371	184	1080779	184	1098162	183	38
39	1011344	189	1028794	189	1046235	189	1063661	189	1081069	188	1098451	188	39
40	1011635	194	1029085	194	1046525	194	1063952	194	1081359	193	1098741	193	40
41	1011926	199	1029375	199	1046816	199	1064242	199	1081649	198	1099030	198	41
42	1012217	203	1029666	203	1047106	203	1064532	203	1081939	203	1099320	203	42
43	1012508	208	1029957	208	1047397	208	1064823	208	1082228	208	1099609	207	43
44	1012799	213	1030248	213	1047688	213	1065113	213	1082518	213	1099899	212	44
45	1013090	218	1030539	218	1047978	218	1065403	218	1082808	217	1100188	217	45
46	1013380	223	1030829	223	1048269	223	1065693	223	1083098	222	1100477	222	46
47	1013671	228	1031120	228	1048559	228	1065984	228	1083388	227	1100767	227	47
48	1013962	232	1031411	232	1048850	232	1066274	232	1083678	232	1101056	232	48
49	1014253	237	1031702	237	1049140	237	1066564	237	1083968	237	1101346	236	49
50	1014544	242	1031992	242	1049431	242	1066854	242	1084258	242	1101635	241	50
51	1014835	247	1032283	247	1049721	247	1067145	247	1084547	246	1101924	246	51
52	1015126	252	1032574	252	1050012	252	1067435	252	1084837	251	1102214	251	52
53	1015416	257	1032864	257	1050302	257	1067725	257	1085127	256	1102503	256	53
54	1015707	261	1033155	261	1050593	261	1068015	261	1085417	261	1102793	261	54
55	1015998	266	1033446	266	1050883	266	1068306	266	1085707	266	1103082	265	55
56	1016289	271	1033737	271	1051174	271	1068596	271	1085997	271	1103371	270	56
57	1016580	276	1034027	276	1051464	276	1068886	276	1086286	275	1103661	275	57
58	1016871	281	1034318	281	1051755	281	1069176	281	1086576	280	1103950	280	58
59	1017162	286	1034609	286	1052045	286	1069466	286	1086866	285	1104239	285	59

TABLE XXV.

Natural Versed Sines.

M.	96°	Parts	97°	Parts	98°	Parts	99°	Parts	100°	Parts	101°	Parts	S.
0	1104528	0	1121869	0	1139173	0	1156434	0	1173648	0	1190809	0	0
1	1104818	5	1122158	5	1139461	5	1156722	5	1173935	5	1191095	5	1
2	1105107	10	1122447	10	1139749	10	1157009	10	1174221	9	1191380	9	2
3	1105396	14	1122735	14	1140037	14	1157296	14	1174508	14	1191666	14	3
4	1105686	19	1123024	19	1140325	19	1157584	19	1174794	19	1191951	19	4
5	1105975	24	1123313	24	1140613	24	1157871	24	1175080	24	1192237	24	5
6	1106264	29	1123601	29	1140901	29	1158158	29	1175367	29	1192522	28	6
7	1106553	34	1123890	34	1141189	34	1158445	33	1175653	33	1192807	33	7
8	1106843	38	1124179	38	1141477	38	1158732	38	1175939	38	1193093	38	8
9	1107132	43	1124467	43	1141765	43	1159020	43	1176226	43	1193378	43	9
10	1107421	48	1124756	48	1142053	48	1159307	48	1176512	48	1193664	47	10
11	1107710	53	1125045	53	1142341	53	1159594	53	1176798	52	1193949	52	11
12	1108000	58	1125333	58	1142629	57	1159881	57	1177085	57	1194234	57	12
13	1108289	63	1125622	62	1142917	62	1160168	62	1177371	62	1194520	62	13
14	1108578	67	1125910	67	1143205	67	1160455	67	1177657	67	1194805	66	14
15	1108867	72	1126199	72	1143493	72	1160743	72	1177944	71	1195090	71	15
16	1109156	77	1126488	77	1143780	77	1161030	76	1178230	76	1195376	76	16
17	1109445	82	1126776	82	1144068	81	1161317	81	1178516	81	1195661	81	17
18	1109734	87	1127065	87	1144356	86	1161604	86	1178802	86	1195946	85	18
19	1110023	91	1127353	91	1144644	91	1161891	91	1179088	91	1196231	90	19
20	1110313	96	1127642	96	1144932	96	1162178	96	1179375	95	1196517	95	20
21	1110602	101	1127930	101	1145220	101	1162465	100	1179661	100	1196802	100	21
22	1110891	106	1128219	106	1145507	105	1162752	105	1179947	105	1197087	104	22
23	1111180	111	1128507	111	1145795	110	1163039	110	1180233	110	1197372	109	23
24	1111469	116	1128796	115	1146083	115	1163326	115	1180519	114	1197657	114	24
25	1111758	120	1129084	120	1146371	120	1163613	120	1180805	119	1197942	119	25
26	1112047	125	1129373	125	1146659	125	1163900	124	1181091	124	1198228	123	26
27	1112336	130	1129661	130	1146946	129	1164187	129	1181377	129	1198513	128	27
28	1112625	135	1129949	135	1147234	134	1164474	134	1181663	133	1198798	133	28
29	1112914	140	1130238	139	1147522	13	1164761	139	1181950	138	1199083	138	29
30	1113203	144	1130526	144	1147809	144	1165048	143	1182236	143	1199368	142	30
31	1113492	149	1130815	140	1148097	149	1165334	148	1182522	148	1199653	147	31
32	1113781	154	1131103	154	1148385	153	1165621	153	1182808	152	1199938	152	32
33	1114070	159	1131391	159	1148672	158	1165908	158	1183094	157	1200223	157	33
34	1114359	164	1131680	163	1148960	163	1166195	163	1183379	162	1200508	161	34
35	1114648	169	1131968	168	1149248	168	1166482	167	1183665	167	1200793	166	35
36	1114937	173	1132256	173	1149535	172	1166769	172	1183951	172	1201078	171	36
37	1115226	178	1132545	178	1149823	177	1167056	177	1184237	176	1201363	176	37
38	1115515	183	1132833	183	1150111	182	1167342	182	1184523	181	1201648	180	38
39	1115804	188	1133121	188	1150398	187	1167629	187	1184809	186	1201933	185	39
40	1116093	193	1133410	192	1150686	192	1167916	191	1185095	191	1202218	190	40
41	1116382	197	1133698	197	1150973	196	1168203	196	1185381	195	1202502	195	41
42	1116671	202	1133986	202	1151261	201	1168489	201	1185667	200	1202787	199	42
43	1116960	207	1134274	207	1151548	206	1168776	206	1185952	205	1203072	204	43
44	1117249	212	1134563	212	1151836	211	1169063	210	1186238	210	1203357	209	44
45	1117537	217	1134851	216	1152123	216	1169350	215	1186524	214	1203642	214	45
46	1117826	222	1135139	221	1152411	220	1169636	220	1186810	219	1203927	218	46
47	1118115	226	1135427	226	1152698	225	1169923	225	1187096	224	1204211	223	47
48	1118404	231	1135716	231	1152986	230	1170209	230	1187381	229	1204496	228	48
49	1118693	236	1136004	236	1153273	235	1170496	234	1187667	234	1204781	233	49
50	1118982	241	1136292	240	1153561	240	1170783	239	1187953	238	1205065	237	50
51	1119270	246	1136580	245	1153848	244	1171069	244	1188238	243	1205350	242	51
52	1119559	250	1136868	250	1154136	249	1171356	249	1188524	248	1205635	247	52
53	1119848	255	1137156	255	1154423	254	1171643	253	1188810	253	1205920	252	53
54	1120137	260	1137445	260	1154710	259	1171929	258	1189095	257	1206204	256	54
55	1120426	265	1137733	264	1154998	264	1172216	263	1189381	262	1206489	261	55
56	1120714	270	1138021	269	1155285	268	1172502	268	1189667	267	1206773	266	56
57	1121003	275	1138309	274	1155572	273	1172789	273	1189952	272	1207058	271	57
58	1121292	279	1138597	279	1155860	278	1173075	277	1190238	276	1207343	275	58
59	1121581	284	1138885	284	1156147	283	1173362	282	1190523	281	1207627	280	59

Natural Versed Sines.

M.	102°	Parts	103°	Parts	104°	Parts	105°	Parts	106°	Parts	107°	Parts	S.
0	1207912	0	1224951	0	1241922	0	1258819	0	1275637	0	1292372	0	0
1	1208196	5	1225234	5	1242204	5	1259100	5	1275917	5	1292650	5	1
2	1208481	9	1225518	9	1242486	9	1259381	9	1276197	9	1292928	9	2
3	1208765	14	1225801	14	1242769	14	1259662	14	1276476	14	1293206	14	3
4	1209050	19	1226085	19	1243051	19	1259943	19	1276756	19	1293484	18	4
5	1209334	24	1226368	24	1243333	24	1260224	23	1277035	23	1293762	23	5
6	1209619	28	1226651	28	1243615	28	1260505	28	1277315	28	1294040	28	6
7	1209903	33	1226935	33	1243897	33	1260785	33	1277594	33	1294318	32	7
8	1210187	38	1227218	38	1244179	38	1261066	37	1277874	37	1294596	37	8
9	1210472	43	1227501	42	1244461	42	1261347	42	1278153	42	1294874	42	9
10	1210756	47	1227784	47	1244743	47	1261628	47	1278432	46	1295152	46	10
11	1211040	52	1228068	52	1245025	52	1261908	51	1278712	51	1295430	51	11
12	1211325	57	1228351	57	1245307	56	1262189	56	1278991	56	1295709	55	12
13	1211609	61	1228634	61	1245589	61	1262470	61	1279270	60	1295986	60	13
14	1211893	66	1228917	66	1245871	66	1262751	65	1279550	65	1296264	65	14
15	1212178	71	1229200	71	1246153	70	1263031	70	1279829	70	1296542	69	15
16	1212462	76	1229484	75	1246435	75	1263312	75	1280108	74	1296819	74	16
17	1212746	80	1229767	80	1246717	80	1263592	79	1280388	79	1297097	78	17
18	1213030	85	1230050	85	1246999	85	1263873	84	1280667	84	1297375	83	18
19	1213315	90	1230333	90	1247281	89	1264154	89	1280946	88	1297653	88	19
20	1213599	95	1230616	94	1247563	94	1264434	93	1281225	93	1297930	92	20
21	1213883	99	1230899	99	1247845	99	1264715	98	1281504	98	1298208	97	21
22	1214167	104	1231182	104	1248126	103	1264995	103	1281783	102	1298486	102	22
23	1214451	109	1231465	108	1248408	108	1265276	107	1282062	107	1298763	106	23
24	1214735	114	1231748	113	1248690	113	1265556	112	1282341	112	1299041	111	24
25	1215019	118	1232031	118	1248972	117	1265837	117	1282620	116	1299318	116	25
26	1215303	123	1232314	123	1249253	122	1266117	121	1282899	121	1299596	120	26
27	1215588	128	1232597	127	1249535	127	1266397	126	1283178	126	1299873	125	27
28	1215872	132	1232880	132	1249817	132	1266678	131	1283457	130	1300151	129	28
29	1216156	137	1233163	137	1250098	136	1266958	135	1283736	135	1300428	134	29
30	1216440	142	1233445	141	1250380	141	1267238	140	1284015	139	1300706	138	30
31	1216724	147	1233728	146	1250662	146	1267519	145	1284294	144	1300983	143	31
32	1217008	151	1234011	151	1250943	150	1267799	149	1284573	149	1301261	148	32
33	1217292	156	1234294	156	1251225	155	1268079	154	1284852	153	1301538	152	33
34	1217575	161	1234577	160	1251506	160	1268359	159	1285131	158	1301815	157	34
35	1217859	166	1234859	165	1251788	164	1268640	163	1285410	163	1302093	162	35
36	1218143	170	1235142	170	1252069	169	1268920	168	1285688	167	1302370	166	36
37	1218427	175	1235425	174	1252351	174	1269200	173	1285967	172	1302647	171	37
38	1218711	180	1235708	179	1252632	179	1269480	177	1286246	177	1302924	175	38
39	1218995	185	1235990	184	1252914	183	1269760	182	1286525	181	1303202	180	39
40	1219279	189	1236273	189	1253195	188	1270040	187	1286803	186	1303479	185	40
41	1219562	194	1236556	193	1253477	193	1270320	191	1287082	191	1303756	189	41
42	1219846	199	1236838	198	1253758	197	1270600	196	1287361	195	1304033	194	42
43	1220130	203	1237120	203	1254039	202	1270880	201	1287639	200	1304310	198	43
44	1220413	208	1237403	207	1254321	207	1271160	205	1287918	205	1304587	203	44
45	1220697	213	1237686	212	1254602	211	1271440	210	1288196	209	1304864	208	45
46	1220981	218	1237968	217	1254883	216	1271720	215	1288475	214	1305141	212	46
47	1221265	222	1238251	222	1255164	221	1272000	219	1288753	219	1305418	217	47
48	1221548	227	1238533	226	1255446	226	1272280	224	1289032	223	1305695	222	48
49	1221832	232	1238816	231	1255727	230	1272560	229	1289310	228	1305972	226	49
50	1222116	237	1239098	236	1256008	235	1272840	233	1289589	232	1306249	231	50
51	1222399	241	1239381	241	1256289	240	1273120	238	1289867	237	1306526	235	51
52	1222683	246	1239663	245	1256571	244	1273400	243	1290145	242	1306803	240	52
53	1222967	251	1239946	250	1256852	249	1273679	247	1290424	246	1307080	245	53
54	1223250	256	1240228	255	1257133	254	1273959	252	1290702	251	1307357	249	54
55	1223534	260	1240510	259	1257414	258	1274239	257	1290981	256	1307633	254	55
56	1223817	265	1240793	264	1257695	263	1274519	261	1291259	260	1307910	258	56
57	1224101	270	1241075	269	1257976	268	1274798	266	1291537	265	1308187	263	57
58	1224384	274	1241357	274	1258257	273	1275078	271	1291815	270	1308464	268	58
59	1224668	279	1241640	278	1258538	277	1275358	275	1292094	274	1308740	272	59

TABLE XXV.

Natural Versed Sines.

M.	108°	Parts	109°	Parts	110°	Parts	111°	Parts	112°	Parts	113°	Parts	S.
0	1309017	0	1325568	0	1342020	0	1358368	0	1374607	0	1390731	0	0
1	1309294	5	1325843	5	1342293	5	1358640	5	1374876	4	1390999	4	1
2	1309570	9	1326118	9	1342567	9	1358911	9	1375146	9	1391267	9	2
3	1309847	14	1326393	14	1342840	14	1359183	14	1375416	13	1391534	13	3
4	1310123	18	1326668	18	1343113	18	1359454	18	1375685	18	1391802	18	4
5	1310400	23	1326943	23	1343387	23	1359725	23	1375955	22	1392070	22	5
6	1310676	28	1327218	27	1343660	27	1359997	27	1376224	27	1392337	27	6
7	1310953	32	1327493	32	1343933	32	1360268	32	1376494	31	1392605	31	7
8	1311229	37	1327768	36	1344206	36	1360540	36	1376763	36	1392872	36	8
9	1311506	41	1328042	41	1344479	41	1360811	41	1377032	40	1393140	40	9
10	1311782	46	1328317	46	1344752	45	1361082	45	1377302	45	1393407	44	10
11	1312059	51	1328592	50	1345025	50	1361353	50	1377571	49	1393675	49	11
12	1312335	55	1328867	55	1345298	54	1361625	54	1377841	54	1393942	53	12
13	1312611	60	1329141	59	1345571	59	1361896	59	1378110	58	1394209	58	13
14	1312888	64	1329416	64	1345844	64	1362167	63	1378379	63	1394477	62	14
15	1313164	69	1329691	68	1346117	68	1362438	68	1378649	67	1394744	67	15
16	1313440	74	1329965	73	1346390	73	1362709	72	1378918	72	1395011	71	16
17	1313716	78	1330240	78	1346663	77	1362980	77	1379187	76	1395278	76	17
18	1313992	83	1330514	82	1346936	82	1363251	81	1379456	81	1395546	80	18
19	1314269	87	1330789	87	1347209	86	1363522	86	1379725	85	1395813	85	19
20	1314545	92	1331063	91	1347481	91	1363793	90	1379994	90	1396080	89	20
21	1314821	97	1331338	96	1347754	95	1364064	95	1380263	94	1396347	93	21
22	1315097	101	1331612	100	1348027	100	1364335	99	1380532	99	1396611	98	22
23	1315373	106	1331887	105	1348299	104	1364606	104	1380801	103	1396881	102	23
24	1315649	110	1332161	110	1348572	109	1364877	108	1381070	108	1397148	107	24
25	1315925	115	1332435	114	1348845	114	1365148	113	1381339	112	1397415	111	25
26	1316201	120	1332710	119	1349117	118	1365418	117	1381608	117	1397682	116	26
27	1316477	124	1332984	123	1349390	123	1365689	122	1381877	121	1397949	120	27
28	1316753	129	1333258	128	1349662	127	1365960	126	1382146	125	1398215	125	28
29	1317029	133	1333533	132	1349935	132	1366231	131	1382415	130	1398482	129	29
30	1317305	138	1333807	137	1350207	136	1366501	135	1382683	134	1398749	133	30
31	1317580	143	1334081	142	1350480	141	1366772	140	1382952	139	1399016	138	31
32	1317856	147	1334355	146	1350752	145	1367042	144	1383221	143	1399283	142	32
33	1318132	152	1334629	151	1351025	150	1367313	149	1383490	148	1399549	147	33
34	1318408	156	1334903	155	1351297	154	1367584	153	1383758	152	1399816	151	34
35	1318684	161	1335178	160	1351569	159	1367854	158	1384027	157	1400082	156	35
36	1318959	166	1335452	164	1351841	163	1368125	162	1384295	161	1400349	160	36
37	1319235	170	1335726	169	1352114	168	1368395	167	1384564	166	1400616	165	37
38	1319511	175	1336000	173	1352386	173	1368665	171	1384832	170	1400882	169	38
39	1319786	179	1336274	178	1352658	177	1368936	176	1385101	175	1401149	174	39
40	1320062	184	1336547	183	1352931	182	1369206	180	1385369	179	1401415	178	40
41	1320337	189	1336821	187	1353203	186	1369476	185	1385638	184	1401681	182	41
42	1320613	193	1337095	192	1353475	191	1369747	189	1385906	188	1401948	187	42
43	1320889	198	1337369	196	1353747	195	1370017	194	1386174	193	1402214	191	43
44	1321164	202	1337643	201	1354019	200	1370287	198	1386443	197	1402480	196	44
45	1321439	207	1337917	205	1354291	204	1370557	203	1386711	202	1402747	200	45
46	1321715	212	1338190	210	1354563	209	1370828	207	1386979	206	1403013	205	46
47	1321990	216	1338464	215	1354835	213	1371098	212	1387247	211	1403279	209	47
48	1322266	221	1338738	219	1355107	218	1371368	216	1387516	215	1403545	214	48
49	1322541	225	1339012	224	1355379	223	1371638	221	1387784	220	1403811	218	49
50	1322816	230	1339285	228	1355651	227	1371908	225	1388052	224	1404078	222	50
51	1323092	235	1339559	233	1355923	232	1372178	230	1388320	229	1404344	227	51
52	1323367	239	1339832	237	1356194	236	1372448	234	1388588	233	1404610	231	52
53	1323642	244	1340106	242	1356466	241	1372718	239	1388856	238	1404876	236	53
54	1323917	248	1340380	247	1356738	245	1372988	243	1389124	242	1405142	240	54
55	1324193	253	1340653	251	1357010	250	1373258	248	1389392	247	1405408	245	55
56	1324468	258	1340927	256	1357281	254	1373528	252	1389660	251	1405673	249	56
57	1324743	262	1341200	260	1357553	259	1373797	257	1389928	256	1405939	254	57
58	1325018	267	1341473	265	1357825	263	1374067	261	1390196	260	1406205	258	58
59	1325293	271	1341747	269	1358096	268	1374337	266	1390463	264	1406471	263	59

Natural Versed Sines.

M.	114°	Parts	115°	Parts	116°	Parts	117°	Parts	118°	Parts	119°	Parts	S.
0	1406737	0	1422618	0	1438371	0	1453990	0	1469472	0	1484810	0	0
1	1407002	4	1422882	4	1438633	4	1454250	4	1469728	4	1485064	4	1
2	1407268	9	1423145	9	1438894	9	1454509	9	1469985	8	1485318	8	2
3	1407534	13	1423409	13	1439155	13	1454768	13	1470242	13	1485573	13	3
4	1407799	18	1423673	17	1439417	17	1455027	17	1470499	17	1485827	17	4
5	1408065	22	1423936	22	1439678	22	1455286	21	1470755	21	1486081	21	5
6	1408330	26	1424199	26	1439939	26	1455545	26	1471012	26	1486335	25	6
7	1408596	31	1424463	31	1440200	30	1455804	30	1471268	30	1486590	30	7
8	1408861	35	1424726	35	1440462	35	1456063	34	1471525	34	1486844	34	8
9	1409127	40	1424990	39	1440723	39	1456322	39	1471782	38	1487098	38	9
10	1409392	44	1425253	44	1440984	43	1456580	43	1472038	43	1487352	42	10
11	1409658	49	1425516	48	1441245	48	1456839	47	1472294	47	1487606	46	11
12	1409923	53	1425779	52	1441506	52	1457098	52	1472551	51	1487860	51	12
13	1410188	57	1426042	57	1441767	56	1457357	56	1472807	55	1488114	55	13
14	1410454	62	1426306	61	1442028	61	1457615	60	1473063	60	1488367	59	14
15	1410719	66	1426569	66	1442289	65	1457874	64	1473320	64	1488621	63	15
16	1410984	71	1426832	70	1442550	69	1458133	69	1473576	68	1488875	68	16
17	1411249	75	1427095	74	1442810	74	1458391	73	1473832	72	1489129	72	17
18	1411514	79	1427358	79	1443071	78	1458650	77	1474088	77	1489382	76	18
19	1411779	84	1427621	83	1443332	82	1458908	82	1474344	81	1489636	80	19
20	1412045	88	1427884	87	1443593	86	1459166	86	1474600	85	1489890	84	20
21	1412310	93	1428147	92	1443853	91	1459425	90	1474856	89	1490143	89	21
22	1412575	97	1428410	96	1444114	95	1459683	95	1475112	94	1490397	93	22
23	1412840	102	1428672	101	1444375	100	1459942	99	1475368	98	1490650	97	23
24	1413104	106	1428935	105	1444635	104	1460200	103	1475624	102	1490904	101	24
25	1413369	110	1429198	109	1444896	109	1460458	107	1475880	106	1491157	106	25
26	1413634	115	1429461	114	1445156	113	1460716	112	1476136	111	1491411	110	26
27	1413899	119	1429723	118	1445417	117	1460974	116	1476392	115	1491664	114	27
28	1414164	124	1429986	122	1445677	122	1461232	120	1476647	119	1491917	118	28
29	1414429	128	1430249	127	1445937	126	1461491	125	1476903	123	1492170	123	29
30	1414693	132	1430511	131	1446198	130	1461749	129	1477159	128	1492424	127	30
31	1414958	137	1430774	136	1446458	135	1462007	133	1477414	132	1492677	131	31
32	1415223	141	1431036	140	1446718	139	1462265	138	1477670	136	1492930	135	32
33	1415487	146	1431299	144	1446979	143	1462523	142	1477925	141	1493183	139	33
34	1415752	150	1431561	149	1447239	148	1462780	146	1478181	145	1493436	144	34
35	1416016	155	1431823	153	1447499	152	1463038	150	1478436	149	1493689	148	35
36	1416281	159	1432086	157	1447759	156	1463296	155	1478692	153	1493942	152	36
37	1416545	163	1432348	162	1448019	161	1463554	159	1478947	158	1494195	156	37
38	1416810	168	1432610	166	1448279	165	1463812	163	1479203	162	1494448	161	38
39	1417074	172	1432873	171	1448539	169	1464069	168	1479458	166	1494700	165	39
40	1417338	177	1433135	175	1448799	174	1464327	172	1479713	170	1494953	169	40
41	1417603	181	1433397	179	1449059	178	1464584	176	1479968	175	1495206	173	41
42	1417867	185	1433659	184	1449319	182	1464842	181	1480223	179	1495459	177	42
43	1418131	190	1433921	188	1449579	187	1465100	185	1480479	183	1495711	182	43
44	1418396	194	1434183	192	1449839	191	1465357	189	1480734	187	1495964	186	44
45	1418660	199	1434445	197	1450098	195	1465615	193	1480989	192	1496217	190	45
46	1418924	203	1434707	201	1450358	200	1465872	198	1481244	196	1496469	194	46
47	1419188	208	1434969	206	1450618	204	1466129	202	1481499	200	1496722	199	47
48	1419452	212	1435231	210	1450878	208	1466386	206	1481754	204	1496974	203	48
49	1419716	216	1435493	214	1451137	213	1466644	211	1482009	209	1497226	207	49
50	1419980	221	1435755	219	1451397	217	1466901	215	1482263	213	1497479	211	50
51	1420244	225	1436017	223	1451656	221	1467158	219	1482518	217	1497731	215	51
52	1420508	230	1436278	227	1451916	226	1467416	224	1482773	221	1497983	220	52
53	1420772	234	1436540	232	1452175	230	1467673	228	1483028	226	1498236	224	53
54	1421036	238	1436802	236	1452435	234	1467930	232	1483282	230	1498488	228	54
55	1421300	243	1437063	241	1452694	239	1468187	236	1483537	234	1498740	232	55
56	1421563	247	1437325	245	1452953	243	1468444	241	1483792	238	1498992	237	56
57	1421827	252	1437587	249	1453213	247	1468701	245	1484046	243	1499244	241	57
58	1422091	256	1437848	254	1453472	252	1468958	249	1484301	247	1499496	245	58
59	1422355	261	1438110	258	1453731	256	1469215	254	1484555	251	1499748	249	59

TABLE XXVI.

TIME to be ADDED to the RIGHT ASCENSION of a STAR, to find the TIME of its PASSING the MERIDIAN on any day of the YEAR.

Days.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Days.
	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	
1	5 14	3 2	1 12	23 18	21 27	19 25	17 20	15 15	13 19	11 31	9 35	7 31	1
2	5 10	2 58	1 8	23 15	21 23	19 20	17 16	15 11	13 16	11 28	9 31	7 27	2
3	5 6	2 54	1 4	23 11	21 20	19 16	17 12	15 8	13 12	11 24	9 27	7 23	3
4	5 1	2 50	1 1	23 7	21 16	19 12	17 8	15 4	13 8	11 20	9 23	7 18	4
5	4 57	2 46	0 57	23 4	21 12	19 8	17 4	15 0	13 5	11 17	9 19	7 14	5
6	4 52	2 42	0 53	23 0	21 8	19 4	17 0	14 56	13 1	11 13	9 15	7 9	6
7	4 48	2 38	0 50	22 56	21 4	19 0	16 56	14 52	12 58	11 9	9 11	7 5	7
8	4 44	2 34	0 46	22 53	21 0	18 56	16 51	14 48	12 54	11 6	9 7	7 1	8
9	4 39	2 30	0 42	22 49	20 56	18 52	16 47	14 45	12 50	11 2	9 3	6 56	9
10	4 35	2 26	0 39	22 45	20 52	18 47	16 43	14 41	12 47	10 58	8 59	6 52	10
11	4 31	2 22	0 35	22 42	20 49	18 43	16 39	14 37	12 43	10 55	8 55	6 47	11
12	4 26	2 18	0 31	22 38	20 45	18 39	16 35	14 33	12 40	10 51	8 51	6 43	12
13	4 22	2 14	0 27	22 34	20 41	18 35	16 31	14 29	12 36	10 47	8 47	6 39	13
14	4 18	2 10	0 24	22 31	20 37	18 31	16 27	14 26	12 32	10 44	8 43	6 34	14
15	4 13	2 6	0 20	22 27	20 33	18 27	16 23	14 22	12 29	10 40	8 39	6 30	15
16	4 9	2 2	0 17	22 23	20 29	18 23	16 19	14 18	12 25	10 36	8 35	6 25	16
17	4 5	1 58	0 13	22 20	20 25	18 18	16 15	14 14	12 22	10 32	8 30	6 21	17
18	4 0	1 55	0 9	22 16	20 21	18 14	16 11	14 11	12 18	10 29	8 26	6 17	18
19	3 56	1 51	0 6	22 12	20 17	18 10	16 7	14 7	12 14	10 25	8 22	6 12	19
20	3 52	1 47	0 2	22 9	20 13	18 6	16 3	14 3	12 11	10 21	8 18	6 8	20
21	3 48	1 43	23 58	22 5	20 9	18 2	15 59	14 0	12 7	10 17	8 14	6 3	21
22	3 43	1 39	23 55	22 1	20 5	17 58	15 55	13 56	12 4	10 14	8 10	5 59	22
23	3 39	1 35	23 51	21 57	20 1	17 53	15 51	13 52	12 0	10 10	8 5	5 54	23
24	3 35	1 32	23 47	21 54	19 57	17 49	15 47	13 48	11 56	10 6	8 1	5 50	24
25	3 31	1 28	23 44	21 50	19 53	17 45	15 43	13 45	11 53	10 2	7 57	5 45	25
26	3 27	1 24	23 40	21 46	19 49	17 41	15 39	13 41	11 49	9 58	7 53	5 41	26
27	3 23	1 20	23 37	21 42	19 45	17 37	15 35	13 37	11 46	9 54	7 48	5 37	27
28	3 18	1 17	23 33	21 39	19 41	17 33	15 31	13 34	11 42	9 51	7 44	5 32	28
29	3 14	1 14	23 29	21 35	19 37	17 29	15 27	13 30	11 38	9 47	7 40	5 28	29
30	3 10		23 26	21 31	19 33	17 24	15 23	13 27	11 35	9 43	7 35	5 23	30
31	3 6		23 22		19 29		15 19	13 23		9 39		5 19	31

TABLE XXVII.

CORRECTION to be SUBTRACTED from the OBSERVED ALTITUDE of a FIXED STAR, to find the TRUE ALTITUDE.

*'s Obs. Alt.	HEIGHT OF THE EYE ABOVE THE SEA, IN FEET.														*'s Obs. Alt.
	4	6	8	10	12	14	16	18	20	22	24	26	28	30	
°	′	′	′	′	′	′	′	′	′	′	′	′	′	′	°
5	11.8	12.2	12.6	12.9	13.2	13 5	13.7	14.0	14.2	14.4	14.6	14.8	15 0	15.1	5
6	10.4	10.8	11.2	11.5	11.8	12.1	12.3	12.6	12.8	13.0	13.2	13.4	13.6	13.7	6
7	9.3	9.7	10.1	10.4	10.7	11.0	11.2	11 5	11.7	11.9	12.1	12 3	12.5	12 6	7
8	8.4	8.8	9.2	9.5	9.8	10.1	10.3	10.6	10.8	11.0	11.2	11.4	11.6	11.7	8
9	7.7	8.1	8.5	8.8	9.1	9.4	9.6	9.9	10.1	10.3	10.5	10 7	10 9	11 0	9
10	7.2	7.6	8.0	8.3	8.6	8.9	9.1	9.4	9.6	9.8	10.0	10.2	10.4	10.5	10
11	6.7	7.1	7.5	7.8	8.1	8.4	8.6	8.9	9.1	9.3	9.5	9.7	9.9	10 0	11
12	6.3	6.7	7.1	7.4	7.7	8.0	8 2	8.5	8.7	8.9	9.1	9.3	9 5	9.6	12
14	5.7	6.1	6.5	6.8	7.1	7.4	7.6	7.9	8.1	8.3	8.5	8.7	8.9	9.0	14
16	5.2	5.6	6.0	6.3	6.6	6.9	7.1	7.4	7.6	7.8	8.0	8.2	8.4	8.5	16
18	4.8	5.2	5.6	5.9	6.2	6.5	6.7	7.0	7.2	7.4	7.6	7.8	8.0	8.1	18
20	4.5	4.9	5.3	5.6	5.9	6.2	6.4	6.7	6.9	7.1	7.3	7.5	7.7	7.8	20
22	4.3	4.7	5 1	5.4	5.7	6.0	6.2	6.5	6.7	6.9	7.1	7.3	7.5	7.6	22
26	3.9	4.3	4.7	5.0	5.3	5.6	5.8	6.1	6.3	6.5	6.7	6.9	7.1	7.2	26
30	3.6	4.0	4.4	4.7	5.0	5.3	5.5	5.8	6.0	6.2	6.4	6.6	6 8	6.9	30
35	3.3	3.7	4.1	4.4	4.7	5.0	5.2	5.5	5.7	5.9	6.1	6 3	6.5	6.6	35
40	3.1	3.5	3.9	4.2	4.5	4.8	5.0	5.3	5.5	5.7	5 9	6.1	6.3	6.4	40
45	2.9	3.3	3.7	4.0	4 3	4.6	4.8	5.1	5.3	5.5	5.7	5.9	6.1	6.3	45
50	2.7	3.1	3.5	3.8	4.1	4.4	4.6	4.9	5.1	5.3	5.5	5.7	5.9	6.1	50
55	2.6	3 0	3.4	3.7	4.0	4.3	4 5	4.8	5.0	5.2	5 4	5.6	5.8	6.0	55
60	2.5	2.9	3.3	3.6	3.9	4.2	4.4	4.7	4.9	5.1	5.3	5.5	5.7	5.9	60
65	2.4	2 8	3.2	3.5	3 8	4.1	4.3	4.6	4.8	5.0	5.2	5.4	5.6	5.8	65
70	2.3	2.7	3.1	3.4	3.7	4.0	4.2	4.5	4.7	4.9	5.1	5.3	5.5	5.7	70
80	2.1	2.5	2.9	3.2	3.6	3.8	4.0	4.3	4.5	4.7	4.9	5.1	5.3	5.5	80
90	1.9	2.3	2.7	3.0	3.3	3.6	3 8	4.1	4.3	4 5	4.7	4 9	5.1	5.3	90

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